LENNOX Service Literature®

UNIT INFORMATION

Corp. 1117-L4
Revised 11-2011

# SL280DFV

## icomfort™ ENABLED SL280DFV SERIES UNITS

SL280DFV series units are 80% efficiency gas furnaces used for downflow applications only, manufactured with Lennox Duralok™ heat exchangers formed of aluminized steel. Units are available in heating capacities of 66,000 to 110,000 Btuh and cooling applications up to 5 tons. Refer to Engineering Handbook for proper sizing.

Units are factory equipped for use with natural gas. Kits are available for conversion to LPG operation. SL280DFV model units are equipped with the icomfort™ enabled SureLight® two-stage variable speed integrated control. All units use a redundant gas valve to assure safety shut-off as required by CSA.

All specifications in this manual are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes. In the absence of local or state codes, the guidelines and procedures outlined in this manual (except where noted) are recommendations only and do not constitute code.

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**⚠WARNING**

**Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life. Installation and service must be performed by a licensed professional installer (or equivalent), service agency or the gas supplier.**

**⚠WARNING**

**Electric shock hazard. Can cause injury or death. Before attempting to perform any service or maintenance, turn the electrical power to unit OFF at disconnect switch(es). Unit may have multiple power supplies.**

**⚠ WARNING**

**Sharp edges.**
**Be careful when servicing unit to avoid sharp edges which may result in personal injury.**



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## SPECIFICATIONS

| | | Model No. | SL280DF070V36A | SL280DF090V48B | SL280DF090V60C | SL280DF110V60C |
|---|---|---|---|---|---|---|
| **Gas Heating Performance** | | [1] AFUE | 80% | 80% | 80% | 80% |
| | **High Fire** | Input - Btuh | 66,000 | 88,000 | 88,000 | 110,000 |
| | | Output - Btuh | 52,000 | 69,000 | 70,000 | 87,000 |
| | | Temperature rise range - °F | 35-65 | 35-65 | 35-65 | 35-65 |
| | | Gas Manifold Pressure (in. w.g.) Nat. Gas / LPG/Propane | 3.5 / 10.0 | 3.5 / 10.0 | 3.5 / 10.0 | 3.5 / 10.0 |
| | **Low Fire** | Input - Btuh | 43,000 | 57,000 | 57,000 | 72,000 |
| | | Output - Btuh | 35,000 | 46,000 | 46,000 | 59,000 |
| | | Temperature rise range - °F | 25-55 | 25-55 | 25-55 | 25-55 |
| | | Gas Manifold Pressure (in. w.g.) Nat. Gas / LPG/Propane | 1.7 / 4.9 | 1.7 / 4.9 | 1.7 / 4.9 | 1.7 / 4.9 |
| **High static - in. w.g.** | | Heating | 0.8 | 0.8 | 0.8 | 0.8 |
| | | Cooling | 1.0 | 1.0 | 1.0 | 1.0 |
| **Connections in.** | | Flue connection - in. round | 4 | 4 | 4 | 4 |
| | | Gas pipe size IPS | 1/2 | 1/2 | 1/2 | 1/2 |
| **Indoor Blower** | | Wheel nominal diameter x width - in. | 10 x 8 | 11 x 9 | 11 x 10 | 11 x 10 |
| | | Motor output - hp | 1/2 | 1 | 1 | 1 |
| | | Tons of add-on cooling | 2 - 3 | 3 - 4 | 3.5 - 5 | 3.5 - 5 |
| | | Air Volume Range - cfm | 589 - 1514 | 830 - 1996 | 899 - 2273 | 882 - 2120 |
| **Electrical Data** | | Voltage | 120 volts - 60 hertz - 1 phase | | | |
| | | Blower motor full load amps | 7.7 | 12.8 | 12.8 | 12.8 |
| | | Maximum overcurrent protection | 15 | 20 | 20 | 20 |
| **Shipping Data** | | lbs. - 1 package | 130 | 153 | 164 | 173 |

NOTE - Filters and provisions for mounting are not furnished and must be field provided.

[1] Annual Fuel Utilization Efficiency based on DOE test procedures and according to FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.

## OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA

| | "A" Width Models | "B" Width Models | "C" Width Models |
|---|---|---|---|
| CABINET ACCESSORIES | | | |
| **Downflow Combustible Flooring Base** | **11M59** | **11M60** | **11M61** |
| CONTROLS | | | |
| **ComfortSense® 7000 Thermostat** | **Y0349** | **Y0349** | **Y0349** |
| **Remote Outdoor Sensor (for dual fuel and Humiidtrol®)** | **X2658** | **X2658** | **X2658** |
| DOWNFLOW FILTER KITS | | | |
| **Downflow Filter Kit** | **51W06** | **51W07** | **51W08** |
| No. and Size of filter - in. | (1) 20 x 16 x 1 | (2) 20 x 20 x 1 | (2) 20 x 20 x 1 |
| NIGHT SERVICE KITS | | | |
| **Night Service Kit** | **84W46** | **84W46** | **84W46** |
| **Safety Service Kit** | **89W19** | **89W19** | **89W19** |

## GAS HEAT ACCESSORIES

| Models | Natural Gas to LPG/Propane Kit | LPG/Propane to Natural Gas Kit |
|---|---|---|
| **all** | **51W02** | **69W79** |

## PARTS IDENTIFICATION

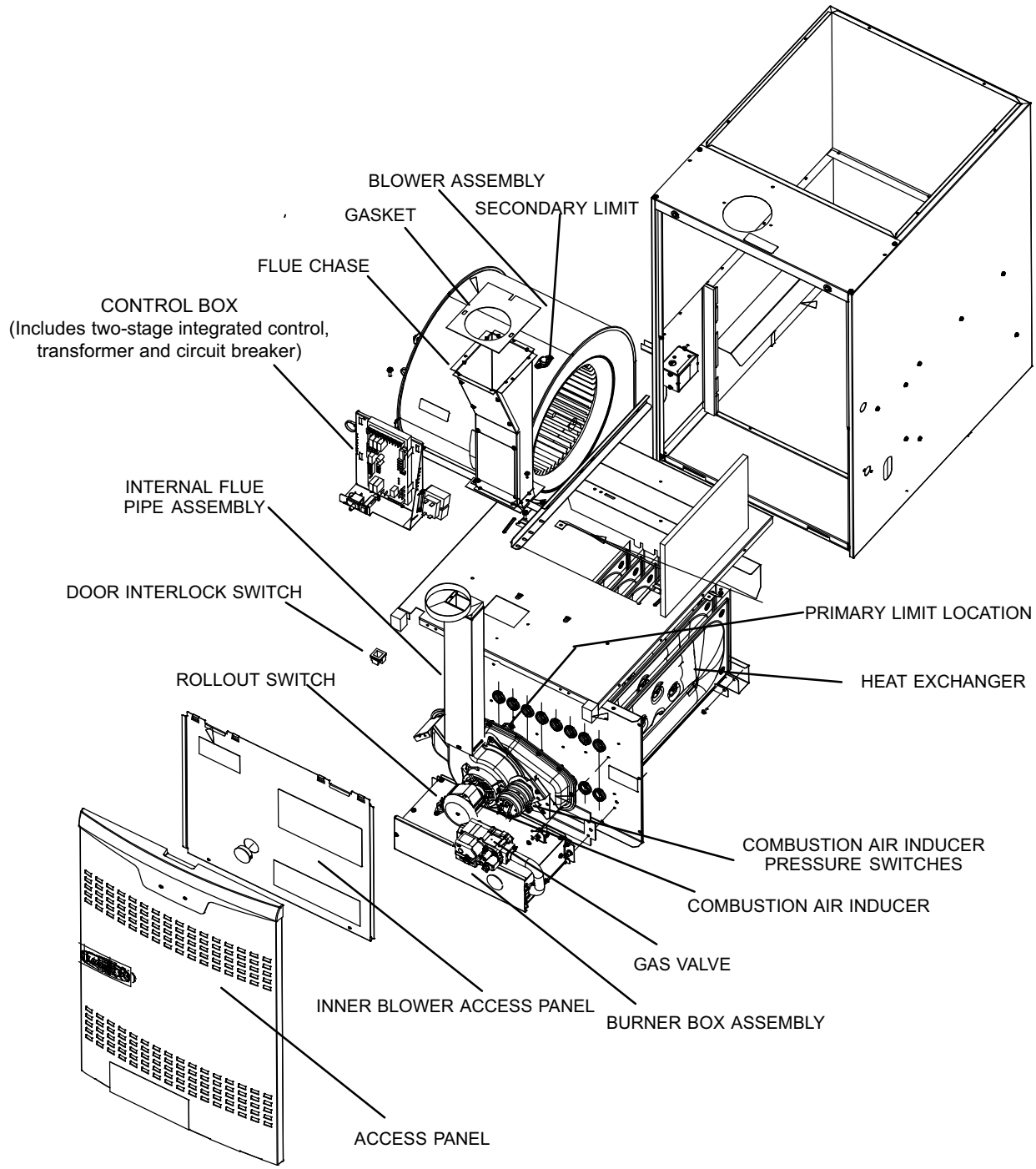



**FIGURE 1**

## I-UNIT COMPONENTS

Unit components are shown in figure 1. The gas valve, combustion air inducer and burners can be accessed by removing the access panel. Electrical components are in the control box (figure 2) found in the blower section.

**⚠ CAUTION**

**Electrostatic discharge can affect electronic components. Take precautions to neutralize electrostatic charge by touching your hand and tools to metal prior to handling the control.**

**A- Control Box**

**1. Control Transformer (T1)**

A transformer located in the control box provides power to the low voltage section of the unit. Transformers on all models are rated 40VA with a 120V primary and a 24V secondary.

**2. Door Interlock Switch (S51)**

An interlock switch rated 14A at 125VAC is wired in series with line voltage. When the indoor blower access panel is removed the unit will shut down.

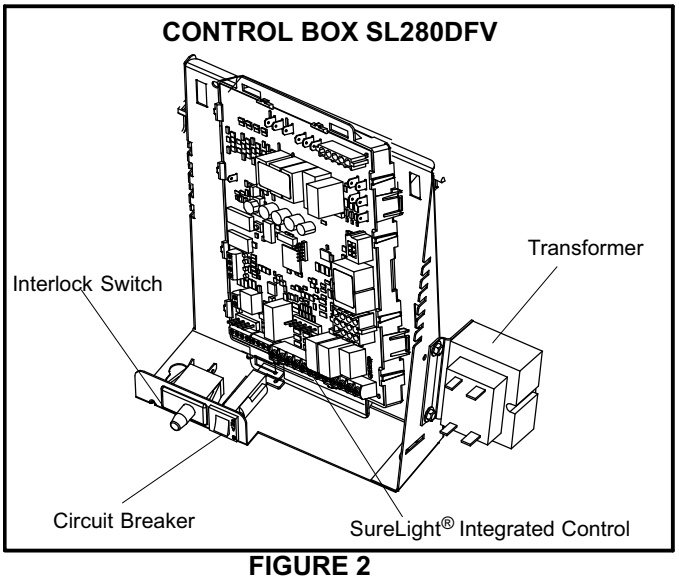



**FIGURE 2**

**3. Circuit Breaker (CB8)**

A 24V circuit breaker is also located in the control box. The switch provides overcurrent protection to the transformer (T1). The breaker is rated 3A at 32V. If the current exceeds this limit the breaker will trip and all unit operation will shutdown. The breaker can be manually reset by pressing the button on the face. See figure 3.

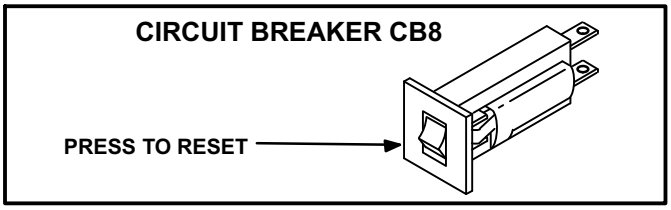



**FIGURE 3**

**⚠ WARNING**

**Shock hazard.**
**Disconnect power before servicing. Integrated control is not field repairable.**

**If control is inoperable, simply replace entire control.**
**Can cause injury or death. Unsafe operation will result if repair is attempted.**

**4. SureLight Integrated Control (A92)**

Units are equipped with the icomfort™ enabled SureLight® two-stage, variable speed integrated control. This control is used with the icomfort Touch® thermostat as part of a communicating comfort system. The control can also operate with a non-communicating conventional single or two-stage thermostat. The system consists of a ignition / blower control (figures 4 and 5) with control pin designations in tables 1, 2 and 3 and ignitor (figure 10). The control and ignitor work in combination to ensure furnace ignition and ignitor durability. The control provides gas ignition, safety checks and indoor blower control with two-stage gas heating. The furnace combustion air inducer, gas valve and indoor blower are controlled in response to various system inputs such as thermostat signal, pressure and limit switch signal and flame signal. The control features a seven-segment LED display, indicating furnace status (including indoor blower) and error codes. The LED flashes in single digits. For example using table 5 under LIMIT CODE, an “E” followed by “2” followed by “5” followed by “0”, the limit switch circuit is open. The control also has two unpowered (dry) 1/4” contacts for a humidifier and a 120 volt accessory terminal. Both rated at (1) one amp each.

**Electronic Ignition**

At the beginning of the heat cycle the integrated control monitors the first stage and second stage combustion air inducer prove switch. The control will not begin the heating cycle if the first stage prove switch is closed (by-passed). Likewise the integrated control will not begin the second stage heating cycle if the second stage prove switch is closed, and will remain in first stage heat. However, if the second stage prove switch closes during the first stage heat pre-purge, the control will allow second stage heat. Once the first stage prove switch is determined to be open, the combustion air inducer is energized on low (first stage)

heat speed. When the differential in the prove switch is great enough, the prove switch closes and a 15-second pre-purge begins.

***NOTE -*** *During abnormal conditions such as low supply voltage or low outdoor temperatures and the low fire pressure switch does not close, the combustion air inducer will switch to high fire. After a 15 second pre-purge the high fire pressure switch will close and the unit will begin operation on high fire. After 10 to 20 seconds of high fire operation the unit will switch to low fire*

After the 15-second pre-purge period, the SureLight ignitor warms up for 20 seconds after which the gas valve opens for a 4-second trial for ignition. The ignitor energizes during the trial until flame is sensed. If ignition is not proved during the 4-second period, the control will try four more times with an inter purge and warm-up time between trials of 35 seconds. After a total of five trials for ignition (including the initial trial), the control goes into Watchguard-Flame Failure mode. After a 60-minute reset period, the control will begin the ignition sequence again.

**Two Stage Operation / Thermostat Selection DIP Switch**

The control can be utilized in two modes: SINGLE-STAGE thermostat or TWO-STAGE thermostat. The thermostat selection is made using a DIP switch and must be positioned for the particular application. DIP switch 1, labeled T"STAT HEAT STAGE is factory-set in the OFF position for use with a two-stage thermostat. Move the DIP switch to ON for use with a single stage thermostat.

While in the single-stage thermostat mode (*single* DIP switch setting), the burners will always fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. After a factory default 10 minute recognition period, the unit will switch to second stage heat. While in the two-stage thermostat mode (*two* DIP switch setting) the burners will fire on first-stage heat. The combustion air inducer will operate on low speed and indoor blower will operate on low heat speed. The unit will switch to second-stage heat on call from the indoor thermostat. If there is a simultaneous call for first and second stage heat, the unit will fire an first stage heat and switch to second stage heat after 30 seconds of operation. See Sequence of Operation flow charts in the back of this manual for more detail.

**TABLE 1**

| SureLight® Control 5 Pin Terminal Designation | |
|---|---|
| **PIN #** | **Function** |
| 1 | Ignitor |
| 2 | Combustion Air Inducer High Speed |
| 3 | Combustion Air Inducer Low Speed |
| 4 | Combustion Air Inducer Neutral |
| 5 | Ignitor Neutral |

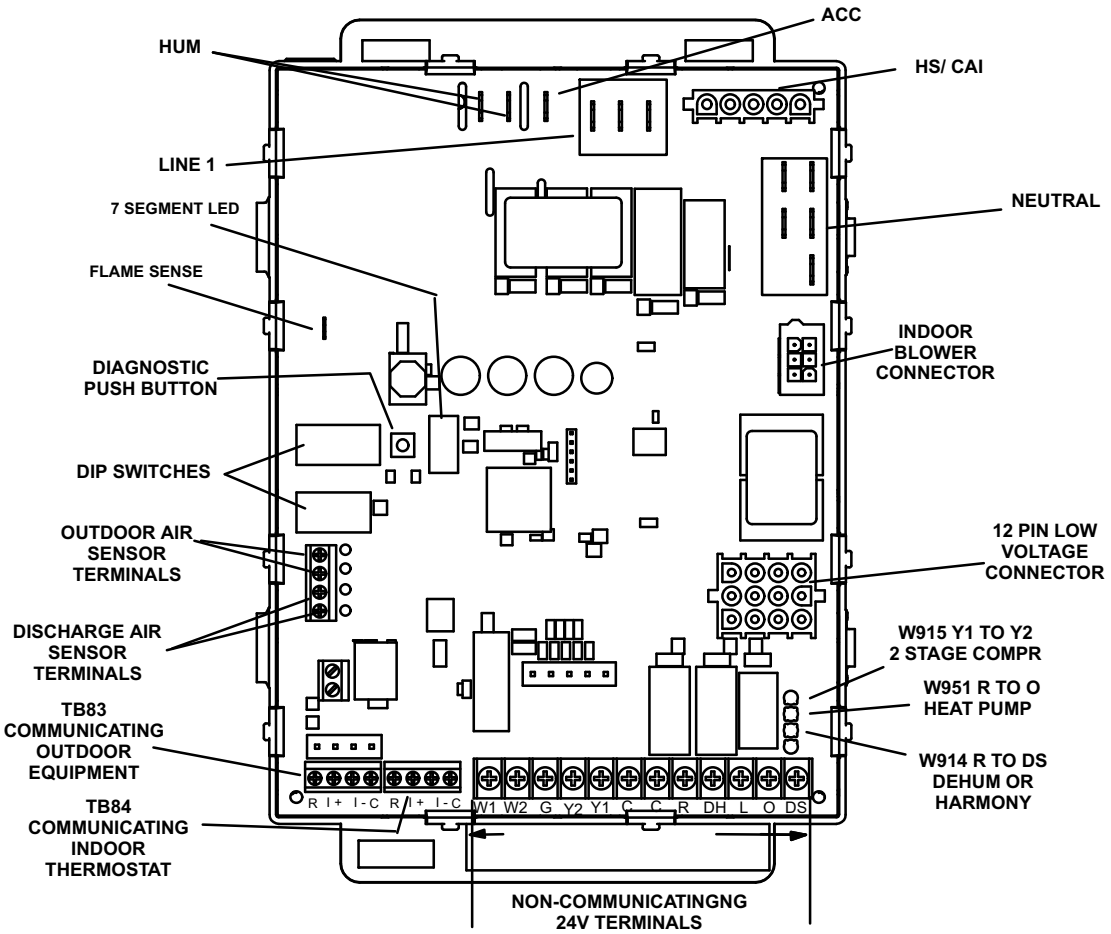
**TABLE 2**

| SureLight® Control 12 Pin Terminal Designation | |
|---|---|
| **PIN #** | **Function** |
| 1 | Gas Valve High Fire |
| 2 | Second Stage Prove Switch |
| 3 | Rollout In |
| 4 | Ground |
| 5 | 24V Hot |
| 6 | Primary Limit In |
| 7 | Gas Valve Low Stage |
| 8 | Gas Valve Common |
| 9 | 24V Neutral |
| 10 | Ground |
| 11 | Rollout Switch Out |
| 12 | 1st Stage Prove Switch |

**TABLE 3**

| SureLight® Control 6 Pin Terminal Designation | |
|---|---|
| **PIN #** | **Function** |
| 1 | Data Input From Motor |
| 2 | Common |
| 3 | Not Used |
| 4 | Data Output To Motor |
| 5 | 5 Volt Bias Supply |
| 6 | Not Used |

## INTEGRATED CONTROL


ACC
HUM
HS/ CAI
LINE 1
NEUTRAL
7 SEGMENT LED
FLAME SENSE
INDOOR BLOWER CONNECTOR
DIAGNOSTIC PUSH BUTTON
DIP SWITCHES
OUTDOOR AIR SENSOR TERMINALS
12 PIN LOW VOLTAGE CONNECTOR
DISCHARGE AIR SENSOR TERMINALS
W915 Y1 TO Y2 2 STAGE COMPR
W951 R TO O HEAT PUMP
TB83 COMMUNICATING OUTDOOR EQUIPMENT
W914 R TO DS DEHUM OR HARMONY
TB84 COMMUNICATING INDOOR THERMOSTAT
R I+ I- C R I+ I- C W1 W2 G Y2 Y1 C C R DH L O DS
NON-COMMUNICATINGNG 24V TERMINALS

### RS-BUS LINK (TB82, future use)

I+ = DATA HIGH CONNECTION
I - = DATA LOW CONNECTION

### RS-BUS OUTDOOR (TB83)

R = 24VAC
I + = DATA HIGH CONNECTION
I - = DATA LOW CONNECTION
C = 24VAC COMMON

### RS-BUS INDOOR (TB84)

R = 24VAC
I + = DATA HIGH CONNECTION
I - = DATA LOW CONNECTION
C = 24VAC COMMON

### 1/4" QUICK CONNECT TERMINALS

HUM = UNPOWERED NORMALLY OPEN (DRY) CONTACTS

XMFR = 120 VAC OUTPUT TO TRANSFORMER

LI = 120 VAC INPUT TO CONTROL

ACC = 120 VAC OUTPUT TO OPTIONAL ACCESSORY

NEUTRALS = 120 VAC NEUTRAL

### THERMOSTAT CONNECTIONS (TB1)

DS = DEHUMIDIFICATION SIGNAL

W2 = HEAT DEMAND FROM 2ND STAGE T/STAT

W1 = HEAT DEMAND FROM 1ST STAGE T/STAT

R = CLASS 2 VOLTAGE TO THERMOSTAT

G = MANUAL FAN FROM T'STAT

C = THERMOSTAT SIGNAL GROUND CONNECTED TO TRANSFORMER GRD (TR) & CHASIS GROUND (GRD)

Y1 = THERMOSTAT 1ST STAGE COOL SIGNAL

Y2 = THERMOSTAT 2ND STAGE COOL SIGNAL

O = THERMOSTAT SIGNAL TO HEAT PUMP REVERSING VALVE

DH = DEHUMIDIFICATION OUTPUT COMMUNICATING THERMOSTAT ONLY

L = USE ONLY WITH A COMMUNICATING THERMOSTAT AND A NON-COMMUNICATING OUTDOOR UNIT

**FIGURE 4**

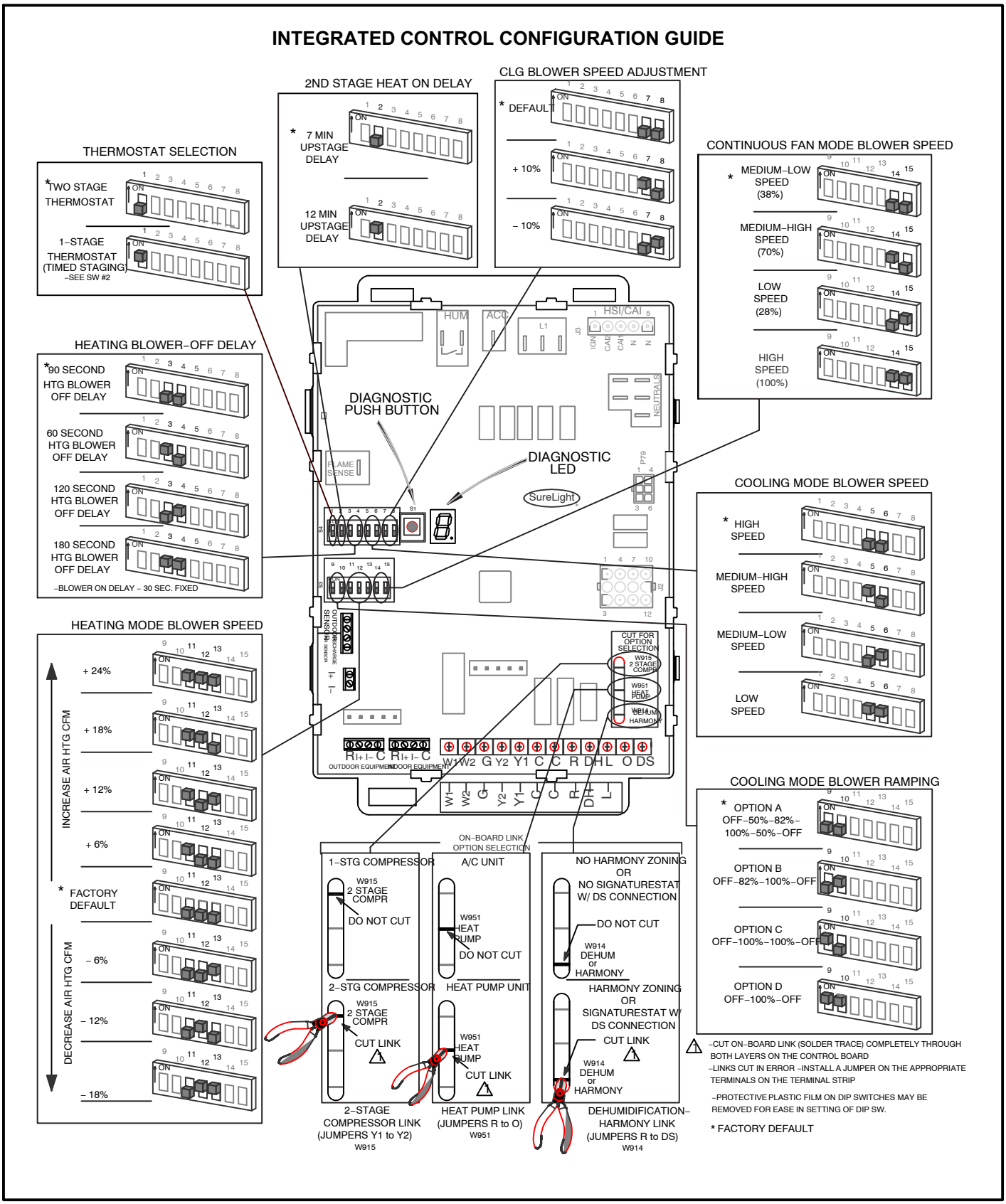

INTEGRATED CONTROL CONFIGURATION GUIDE
THERMOSTAT SELECTION
*TWO STAGE THERMOSTAT
1–STAGE THERMOSTAT (TIMED STAGING) –SEE SW #2
2ND STAGE HEAT ON DELAY
* 7 MIN UPSTAGE DELAY
12 MIN UPSTAGE DELAY
CLG BLOWER SPEED ADJUSTMENT
* DEFAULT
+ 10%
– 10%
CONTINUOUS FAN MODE BLOWER SPEED
* MEDIUM–LOW SPEED (38%)
MEDIUM–HIGH SPEED (70%)
LOW SPEED (28%)
HIGH SPEED (100%)
HEATING BLOWER–OFF DELAY
*90 SECOND HTG BLOWER OFF DELAY
60 SECOND HTG BLOWER OFF DELAY
120 SECOND HTG BLOWER OFF DELAY
180 SECOND HTG BLOWER OFF DELAY
–BLOWER ON DELAY – 30 SEC. FIXED
DIAGNOSTIC PUSH BUTTON
DIAGNOSTIC LED
SureLight
HSI/CAI
NEUTRALS
FLAME SENSE
COOLING MODE BLOWER SPEED
* HIGH SPEED
MEDIUM–HIGH SPEED
MEDIUM–LOW SPEED
LOW SPEED
HEATING MODE BLOWER SPEED
INCREASE AIR HTG CFM
DECREASE AIR HTG CFM
+ 24%
+ 18%
+ 12%
+ 6%
* FACTORY DEFAULT
– 6%
– 12%
– 18%
CUT FOR OPTION SELECTION
W915 2 STAGE COMPR
W951 HEAT PUMP
W914 DEHUM or HARMONY
OUTDOOR EQUIPMENT
INDOOR EQUIPMENT
W1 W2 G Y2 Y1 C C R DH L O DS
ON–BOARD LINK OPTION SELECTION
1–STG COMPRESSOR
A/C UNIT
DO NOT CUT
2–STG COMPRESSOR
HEAT PUMP UNIT
CUT LINK
2–STAGE COMPRESSOR LINK (JUMPERS Y1 to Y2)
W915
HEAT PUMP LINK (JUMPERS R to O)
W951
NO HARMONY ZONING OR NO SIGNATURESTAT W/ DS CONNECTION
HARMONY ZONING OR SIGNATURESTAT W/ DS CONNECTION
DEHUMIDIFICATION–HARMONY LINK (JUMPERS R to DS)
W914
COOLING MODE BLOWER RAMPING
* OPTION A OFF–50%–82%–100%–50%–OFF
OPTION B OFF–82%–100%–OFF
OPTION C OFF–100%–100%–OFF
OPTION D OFF–100%–OFF
1 –CUT ON–BOARD LINK (SOLDER TRACE) COMPLETELY THROUGH BOTH LAYERS ON THE CONTROL BOARD
–LINKS CUT IN ERROR –INSTALL A JUMPER ON THE APPROPRIATE TERMINALS ON THE TERMINAL STRIP
–PROTECTIVE PLASTIC FILM ON DIP SWITCHES MAY BE REMOVED FOR EASE IN SETTING OF DIP SW.
* FACTORY DEFAULT

**FIGURE 5**

**TABLE 4**
**Integrated Control Diagnostic Modes**

| Display | Action (when button released) |
|---|---|
| No change (idle)* | Remain in idle mode |
| Solid “E” | Enter diagnostic recall mode |
| Solid “D” | Discharge Air Installed |
| Solid “F” | Enter flame signal mode |
| Solid “P” (variable speed only) | Program unit capacity/size (Unit Code) |

* No change implies the display will continue to show whatever is currently being displayed for normal operation (blinking decimal, active error code, heat state, etc..)

**Diagnostic LED (Figure 4)**

The seven-segment diagnostic LED displays operating status, target airflow, error codes and other information. The table beginning on Page 9 lists diagnostic LED codes.

**Diagnostic Push Button (Figure 4)**

The diagnostic push button is located adjacent to the seven-segment diagnostic LED. This button is used to enable the Error Code Recall “E” mode and the Flame Signal “F” mode. Press the button and hold it to cycle through a menu of options. Every five seconds a new menu item will be displayed. When the button is released, the displayed item will be selected. Once all items in the menu have been displayed, the menu resumes from the beginning until the button is released.

**Error Code Recall Mode**

Select ”E” from the menu to access the most recent 10 error codes. Select “c” from the Error Code Recall menu to clear all error codes. Button must be pressed a second time while “c” is flashing to confirm command to delete codes. Press the button until a solid “≡” is displayed to exit the Error Code Recall mode.

**Flame Signal Mode**

Select ”F” from the menu to access the flame signal mode. The integrated control will display the flame current on 7 segment LED in in micro amps (uA).

Flame signal mode is exited after any of the following:

- Power is reset
- Pressing and holding push button until 3 horizontal lines “≡” are displayed
- 10 minutes after entering the flame sense mode.

**Program Unit Capacity/Size Mode**

After the “P” is selected (by releasing the push button) the integrated control will start flashing the “P” on display for 90 seconds. If push button is pressed again and held during that time, the control will start to display characters corresponding to different variable speed furnace models for 3 seconds each. While the wanted character-model is displayed push button has to be released. Selected option will flash display for 10 seconds and during that time push button has to be pressed and held for 5 seconds. Once control accepts new setting it will store data in non-volatile memory and reset itself. If 10 seconds expires or push button is held less than 5 seconds, control will exit field test mode and go into idle without changing programming the unit size.

**TABLE 5**
**Integrated Diagnostic Codes/Status of Equipment I.**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| . | Idle mode (Decimal blinks at 1 Hertz -- 0.5 second ON, 0.5 second OFF). | |
| A | Cubic feet per minute (cfm) setting for indoor blower (1 second ON, 0.5 second OFF) / cfm setting for current mode displayed. | |
| C | Cooling stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes). | |
| d | Dehumidification mode (1 second ON) / 1 second OFF) / cfm setting displayed / Pause / Repeat Codes). | |
| h | Heat pump stage (1 second ON, 0.5 second OFF) / % of input rate displayed / Pause / cfm setting / Pause / Repeat codes. | |
| H | Gas Heat Stage (1 second ON, 0.5 second OFF) / 1 or 2 displayed / Pause / cfm setting displayed / Pause / Repeat codes. Blinking during ignition. | |
| dF | Defrost mode. | |
| U | Discharge Air Temperature | |
| E 105 | Device communication problem - No other devices on RS BUS (Communication system). | Equipment is unable to communicate. Indicates numerous message errors. In most cases errors are related to electrical noise. Make sure high voltage power is separated from RSBus. Check for miswired and/or loose connections between the stat, indoor unit and outdoor unit. Check for a high voltage source of noise close to the system. Fault clears after communication is restored. |
| E 110 | Low line voltage. | Line Voltage Low (Voltage lower than nameplate rating). Check power line voltage and correct. Alarm clears 5 seconds after fault recovered. |
| E 111 | Line voltage polarity reversed. | Reverse line power voltage wiring. System resumes normal operation 5 seconds after fault recovered. |
| E 112 | Ground not detected | System shuts down. Provide proper earth ground. System resumes normal operation 5 seconds after fault recovered. |
| E 113 | High line voltage. | Line Voltage High (Voltage higher than nameplate rating). Provide power voltage within proper range. System resumes normal operation 5 seconds after fault recovered. |
| E 114 | Line voltage frequency out-of-range. | No 60 Hertz Power. Check voltage and line power frequency. Correct voltage and frequency problems. System resumes normal operation 5 seconds after fault recovered. |
| E 115 | Low 24V - Control will restart if the error recovers. | 24-Volt Power Low (Range is 18 to 30 volts). Check and correct voltage. Check for additional power-robbing equipment connected to system. May require installation of larger VA transformer to be installed in furnace / air handler. Clears after fault recovered. |
| E 116 | High 24V. | 24 Volt Power High (Range is 18 to 30 volts). Check and correct voltage. Check for proper line voltage (120V, 240V, etc.) to equipment. Clears when control senses proper voltage. |
| E 117 | Poor ground detected (Warning only) | Provide proper grounding for unit. Check for proper earth ground to the system. Warning only will clear 30 seconds after fault recovered. |
| E 120 | Unresponsive device. Communication only. | Usually caused by delay in outdoor unit responding to indoor unit poling. Recycle power. Check all wiring connections. Cleared after unresponsive device responds to any inquiry. |

**TABLE 5 Continued**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| E 124 | Active communicating thermostat signal missing for more than 3 minutes. | Equipment lost communication with the thermostat. Check four wiring connections, ohm wires and cycle power at the thermostat. Alert stops all services and waits for heartbeat message from thermostat (subnet controller). Cleared after valid thermostat (subnet controller) message is received. |
| E 125 | Control failed self-check, internal error, failed hardware. Will restart if error recovers. Integrated control not communicating. Covers hardware errors (flame sense circuit faults, pin shorts, etc.). | Hardware problem on the control. Cycle power on control. Replace if problem prevents service and is persistent. Critical alert. Cleared 300 seconds after fault recovered. |
| E 126 | Control internal communication problem. | Hardware problem on the control. Cycle power on control. Replace if problem prevents service and is persistent. Cleared 300 seconds after fault recovered. |
| E 131 | Corrupted control parameters (Verify configuration of system). Communicating only. | Reconfigure the system. Replace control if heating or cooling is not available. Only applicable in the communicating mode, not in startup. Exit from Commissioning and Execute 'Set Factory Default mode'. Control will still operate on default parameter settings. |
| E 180 | Outdoor air temperature sensor failure. Only shown if shorted or out-of-range. | Compare outdoor sensor resistance to temperature/resistance charts in unit installation instructions. Replace sensor pack if necessary. At beginning of (any) configuration, furnace or air handler control will sense outdoor air and discharge air temperature sensor(s). If detected (reading in range), appropriate feature will be set as 'installed' and that could be seen in 'About' screen. In normal operation after control recognizes sensors, alarm will be sent if valid temperature reading is lost. To get rid of setting and alarm, redo configuration and make sure that temperature sensor is marked as 'not installed' in Indoor Unit 'About' screen. When Indoor unit control is replaced, thermostat will 'tell' new control if temperature sensor is in system or not. Clears 30 seconds after fault recovered. |
| E 200 | Hard lockout - Rollout circuit open or previously open. | Correct cause of rollout trip, or replace flame rollout switch. Test furnace operation. Cleared after fault recovered. |
| E 201 | Indoor blower communication failure - Unable to communicate with blower motor. | Indoor blower communication failure (including power outage). Lost communication with indoor blower motor. Possible causes: motor not powered, loose wiring. Problem may be on control or motor side. Cleared after fault recovered. |
| E 202 | Indoor blower motor mis-match - Indoor motor horsepower does not match unit capacity. See Page 38. | Incorrect appliance capacity code selected. Check for proper configuring under: Unit Size Codes for Furnace/Air Handler on configuration guide or in installation instructions. Cleared after the correct match is detected following a reset. (Remove thermostat from system while applying power and reprogramming.) |
| E 203 | Appliance capacity / size is NOT programmed. Invalid unit codes refer to configuration flow chart. See Page 38. | No appliance capacity code selected. Check for proper configuring under: Unit Size Codes for Furnace on configuration guide or in installation instructions. Critical Alert. Cleared after valid unit code is read following a reset. (Remove thermostat from system while applying power and reprogramming.) |
| E 204 | Gas valve mis-wired. | Check gas valve operation and wiring. Clears when repaired. |
| E 205 | Gas valve control relay contact shorted. | Check wiring on control and gas valve. If wiring is correct, replace control. |

**TABLE 5 Continued**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| E 206 | Gas valve second-stage relay failure | Furnace will operate on 1st stage for remainder of the heating demand. Will clear after fault recovered. If unable to operate 2nd stage, replace control. |
| E 207 | Hot surface ignitor sensed open - Refer to troubleshooting. SeePage 43. | Measure resistance of hot surface ignitor. Replace if open or not within specified range found in IOM. Resumes normal operation after fault is cleared. |
| E 223 | Low pressure switch failed open. | Check pressure (inches w.c.) of low pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Resumes normal operation after fault is cleared |
| E 224 | Low pressure switch failed closed - Refer to troubleshooting. See Page 43. | Check operation of low pressure switch to see if it is stuck closed on heat call longer than 150 seconds. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Resumes normal operation after fault is cleared. |
| E 225 | High pressure switch failed open - Refer to troubleshooting. See Page 43. | Check pressure (inches w.c.) of high pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Resumes normal operation after fault is cleared. |
| E 226 | High pressure switch failed closed - Refer to troubleshooting. See Page 43. | Check operation of high pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Resumes normal operation after fault is cleared. |
| E 227 | Low pressure switch open during trial for ignition or run mode. Refer to troubleshooting. See Page 43. | Check pressure (inches w.c.) of low pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Resumes normal operation after fault is cleared. |
| E 228 | Combustion air inducer calibration failure | Unable to perform pressure switch calibration. Check vent system and pressure switch wiring connections. Resumes normal operation after fault is cleared. |
| E 229 | Ignition on high fire | IFC switched to high fire ignition because low fire pressure switch did not close in allowed time. No action is needed. |
| E 240 | Low flame current - Run mode - Refer to troubleshooting. See Page 43. | Check micro-amperes of flame sensor using control diagnostics or field-installed mode. Clean or replace sensor. Measure voltage of neutral to ground to ensure good unit ground. Alert clears after current heat call has been completed. |
| E 241 | Flame sensed out of sequence - Flame still present. | Shut off gas. Check for gas valve leak. Replace, if necessary. Alert clears when fault is recovered. |
| E 250 | Limit switch circuit open - Refer to troubleshooting. See Page 43 | Check for proper firing rate on furnace. Ensure there is no blockage in heater. Check for proper air flow. If limit not closed within 3 minutes, unit will go into 1-hour soft lockout. Resumes normal operation after fault is cleared. |
| E 252 | Discharge air temperature too high (gas heat only). | Check temperature rise, air flow and input rate. Cleared when heat call is finished. |
| E 270 | Soft lockout - Exceeded maximum number of retries. No flame current sensed. | Check for proper gas flow. Ensure that ignitor is lighting burner. Check flame sensor current. Clears when heat call finishes successfully. |

**TABLE 5 Continued**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| E 271 | Soft lockout - Exceeded maximum number of retries. Last retry failed due to the pressure switch opening. | Check pressure (inches w.c.) of low pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Clears when heat call finishes successfully. |
| E 272 | Soft lockout - Exceeded maximum number of recycles. Last recycle due to the pressure switch opening. | Check operation of low pressure switch to see if it is stuck closed on heat call. Check pressure (inches w.c.) of high pressure switch closing on heat call. Measure operating pressure (inches w.c.). Inspect vent and combustion air inducer for correct operation and restriction. Clears when heat call finishes successfully. |
| E 273 | Soft lockout - Exceeded maximum number of recycles. Last recycle due to flame failure. | Check micro-amperes of flame sensor using control diagnostics or field-installed mode. Clean or replace sensor. Measure voltage of neutral to ground to ensure good unit ground. Clears when heat call finishes successfully. |
| E 274 | Soft lockout - Exceeded maximum number of recycles. Last recycle failed due to the limit circuit opening or limit remained open longer than 3 minutes. | Shut down system. 1-hour soft lockout. Check firing rate and air flow. Check for blockage. Clears when heat call finishes successfully. |
| E 275 | Soft lockout - Flame sensed out of sequence. Flame signal is gone. | Shut off gas. Check for gas valve leak. 1-hour soft lockout. Clears when flame has been proven stable. |
| E 276 | Watchguard calibration failure. | Unable to perform pressure switch calibration. Check vent system and pressure switch wiring connections. 1-hour soft lockout. Clears when calibration has finished successfully. |
| E 290 | Ignitor circuit fault - Failed ignitor or triggering circuitry. | Measure resistance of hot surface ignitor. Replace if open or not within specifications. 1-hour soft lockout. Clears when flame has been proven stable. |
| E 291 | Heat air flow restricted below the minimum. | Check for dirty filter and air flow restriction. Check blower performance. 1-hour soft lockout. Cleared when heat call finishes successfully. |
| E 292 | Indoor blower motor unable to start due to obstructed wheel, seized bearings. | Indoor blower motor unable to start (seized bearing, stuck wheel, etc.). Replace motor or wheel if assembly does not operate or meet performance standards. 1-hour soft lockout. Clears after circulator successfully starts. |
| E 294 | Combustion air inducer over current. | Check combustion blower bearings, wiring and amps. Replace if does not operate or does not meet performance standards. Clears after inducer current is sensed to be in-range after the ignition following the soft lockout or reset. |
| E 295 | Indoor blower motor temperature is too high. | Indoor blower motor over temperature (motor tripped on internal protector). Check motor bearings and amps. Replace if necessary. Cleared after blower demand is satisfied. |
| E 310 | Discharge error temperature sensor failure. Only shown if shorted or out of range. | Compare outdoor sensor resistance to temperature/resistance charts in installation instructions. Replace sensor if necessary. Cleared in Communicating mode: 30 seconds after fault recovered. In Non-Communicating mode: Cleared after the current heat call is completed. |
| E 311 | Heat rate reduced to match indoor blower air flow. | Warning Only. Furnace blower in cutback mode due to restricted airflow. Reduce firing rate every 60 seconds to match available CFM. Check filter and duct system. To clear, replace filter if needed or repair/add duct. 2-stage controls will reduce firing rate to 1st stage. Clears when heat call finishes successfully. |

**TABLE 5 Continued**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| E 312 | Restricted air flow in cooling or continuous fan mode is lower than cfm setting. | Warning Only. Restricted airflow - Indoor blower is running at a reduced CFM (Cutback Mode - The variable speed motor has pre-set speed and torque limiters to protect the motor from damage caused by operating outside of design parameters (0 to 0.8" W.C.. total external static pressure). Check filter and duct system. To clear, replace filter if needed or repair/add duct. Cleared after the current service demand is satisfied. |
| E 313 | Indoor or outdoor unit capacity mismatch. Communication only. | Incorrect indoor/outdoor capacity code selected. Check for proper configuring in installation instructions. Alarm is just a warning. The system will operate, but might not meet efficiency and capacity parameters. Alarm will clear when commissioning is exited. Cleared after commissioning is complete. |
| E 331 | Global network connection - Communication link problem. | For Future Use. |
| E 334 | Relay "Y1" stuck on interated control. | Replace integrated control. |
| E 347 | No 24 Volt output on Y1 of "integrated control" with non communicating outdoor unit. | Operation stopped. Y1 relay / Stage 1 failed. (Pilot relay contacts did not close or the relay coil did not energize; no input back to IFC chip). Critical Alert. Cleared after reset and Y1 input sensed. |
| E 348 | No 24 Volt output on Y2 of "integrated control" with non?communicating outdoor unit. | Y2 relay / Stage 2 failed. (Pilot relay contacts did not close or the relay coil did not energize; no input back to IFC chip). Critical Alert. Cleared after reset and Y1 input sensed. |
| E 349 | No 24 Volts between R & O on "integrated control" with non communicating outdoor unit (Dual fuel module required for heat pump application). | Configuration link R to O needs to be restored. Replace link or hard-wire. Applicable in non communicating mode. Critical Alert. |
| E 370 | Interlock switch sensed open for 2 minutes. | Control sees the loss of 24VAC for 2 minutes .Terminate all services and wait for interlock switch to close. The alarm will clear when 24VAC is continuously sensed on DS terminal for a minimum of 10 seconds or on a power reset. |
| E 400 | LSOM - Compressor internal overload tripped. | Thermostat demand Y1 is present; but, compressor is not running. Check power to outdoor unit. Clears the error after current is sensed in both RUN and START sensors for at least 2 seconds, or after service is removed, or after power reset. |
| E 401 | LSOM Compressor long run cycle or low system pressure. | Compressor ran more than 18 hours to satisfy a single thermostat demand. Critical Alert. Clears the error after 30 consecutive normal run cycles or power reset. Also monitors low pressure switch trips. |
| E 402 | LSOM - Outdoor unit system pressure trip. | Discharge or suction pressure out-of-limits, or compressor overloaded. Clears the error after 4 consecutive normal compressor run cycles. |
| E 403 | LSOM - Compressor short-cycling. .(Running less than 4 minutes). Outdoor unit pressure trip | Compressor runs less than 3 minutes to satisfy a thermostat demand. Clears the error after 4 consecutive normal run cycles or power reset. |
| E 404 | LSOM - Compressor rotor locked. Compressor short-cycling. (Running less than 4 minutes). | Compressor rotor locked up due to run capacitor short, bearings are seized, excessive liquid refrigerant, etc. Clears the error after 4 consecutive normal run cycles or after power reset. |
| E 405 | LSOM - Compressor open circuit. | Compressor circuit open (due to power disconnection, open fuse, etc.) Clears the error after 1 normal compressor run cycle. |

**TABLE 5 Continued**

| Code | Diagnostic Codes/Status of Equipment | Action Required to Clear and Recover |
|---|---|---|
| E 406 | LSOM - Compressor open start circuit. | Required amount of current is not passing through Start current transformer. Clears the error after current is sensed in START sensor, or after power reset. |
| E 407 | LSOM - Compressor open run circuit. | Required amount of current is not passing through Run current transformer. Clears the error after current is sensed in RUN sensor, or 1 normal compressor run cycle, or after power reset. |
| E 408 | LSOM - Compressor contactor is welded. | Compressor runs continuously. Clears the error after 1 normal compressor run cycle or after power reset. |
| E 409 | LSOM - Compressor low voltage. | Secondary voltage is below 18VAC. After 10 minutes, operation is discontinued. Clears the code after voltage is higher than 20 VAC for 2 seconds or after power reset. |

**DIP Switch Settings**

***NOTE -*** *All icomfort ™ settings are set at the icomfort Touch® thermostat. See icomfort ™ installation instruction. In icomfort ™ communication system all DIP switch and clippable link settings are ignored. For conventional thermostats proceed with DIP switch and clippable link settings as outlined in the following.*

**Heating Operation DIP Switch Settings**

**Switch 1 -- Thermostat Selection --** This unit may be used with either a single-stage or two-stage thermostat. The thermostat selection is made using a DIP switch which must be properly positioned for the particular application. The DIP switch is factory-positioned for use with a two-stage thermostat. If a single-stage thermostat is to be used, the DIP switch must be repositioned.

a - *Select "OFF"* for two-stage heating operation controlled by a two-stage heating thermostat (factory setting);

b - *Select "ON"* for two-stage heating operation controlled by a single-stage heating thermostat. This setting provides a timed delay before second-stage heat is initiated.

**Switch 2 -- Second Stage Delay (Used with Single-Stage Thermostat Only) --** This switch is used to determine the second stage on delay when a single-stage thermostat is being used. The switch is factory-set in the OFF position, which provides a 7-minute delay before second-stage heat is initiated. If the switch is toggled to the ON position, it will provide a 12-minute delay before second-stage heat is initiated. This switch is only activated when the thermostat selector jumper is positioned for SINGLE-stage thermostat use.

**Switches 3 and 4 -- Blower-Off Delay --** The blower-on delay of 30 seconds is not adjustable. The blower-off delay (time that the blower operates after the heating demand has been satisfied) can be adjusted by moving switches 3 and 4 on the integrated control. The unit is shipped from the factory with a blower-off delay of 90 seconds. The blower off delay affects comfort and is adjustable to satisfy individual applications. Adjust the blower off delay to achieve a supply air temperature between 90° and 110°F at the exact moment that the blower is de-energized. Longer off delay settings provide lower supply air temperatures; shorter settings provide higher supply air temperatures.Table 6 provides the blower off timings that will result from different switch settings.

**TABLE 6**
**Blower Off Delay Switch Settings**

| Blower Off Delay (Seconds) | Switch 3 | Switch 4 |
|---|---|---|
| 60 | On | Off |
| 90 (Factory) | Off | Off |
| 120 | Off | On |
| 180 | On | On |

**Indoor Blower Operation DIP Switch Settings**

**Switches 5 and 6 -- Cooling Mode Blower Speed --** The unit is shipped from the factory with the dip switches positioned for high speed (4) indoor blower motor operation during the cooling mode. Table 7 provides the cooling mode blower speeds that will result from different switch settings. Switches 5 and 6 set the blower cfm for second-stage cool. The integrated control automatically ramps down to 70% of the second-stage cfm for first-stage cfm. Refer to blower tables for corresponding cfm values.

**TABLE 7**
**Cooling Mode Blower Speeds**

| Speed | Switch 5 | Switch 6 |
|---|---|---|
| Low | On | On |
| Medium Low | Off | On |
| Medium High | On | Off |
| High (Factory) | Off | Off |

**Switches 7 and 8 -- Cooling Blower Speed Adjustment --** The unit is shipped from the factory with the dip switches positioned for NORMAL (no) adjustment. The dip switches may be positioned to adjust the blower speed by +10% or

-10% to better suit the application. Table 8 below provides blower speed adjustments that will result from different switch settings. Refer to blower tables for corresponding cfm values.

**TABLE 8**
**Cooling Blower Speed Adjustment**

| Adjustment | Switch 7 | Switch 8 |
|---|---|---|
| +10% (approx.) | On | Off |
| Factory Default | Off | Off |
| -10% (approx.) | Off | On |

**Switches 9 and 10 -- Cooling Mode Blower Speed Ramping --** Blower speed ramping may be used to enhance dehumidification performance. The switches are factory set at option A which has the greatest effect on dehumidification performance. Table 9 provides the cooling mode blower speed ramping options that will result from different switch settings. The cooling mode blower speed ramping options are detailed below.

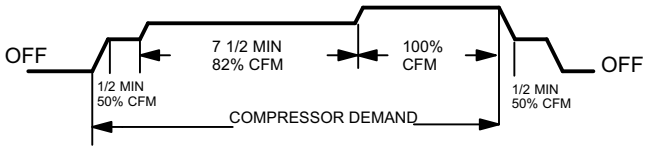
***NOTE -*** *The off portion of the selected ramp profile also applies during heat pump operation in dual fuel applications.*

**TABLE 9**
**Cooling Mode Blower Speed Ramping**

| Ramping Option | Switch 9 | Switch 10 |
|---|---|---|
| A (Factory) | Off | Off |
| B | Off | On |
| C | On | Off |
| D | On | On |

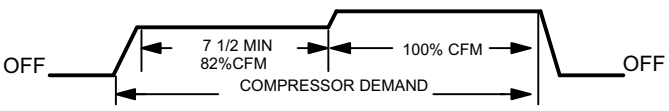
**Ramping Option A (Factory Selection)**

- Motor runs at 50% for 30 seconds.
- Motor then runs at 82% for approximately 7-1/2 minutes.
- If demand has not been satisfied after 7-1/2 minutes, motor runs at 100% until demand is satisfied.
- Once demand is met, motor runs at 50% for 30 seconds then ramps down to stop.



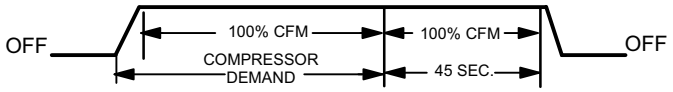

**Ramping Option B**

- Motor runs at 82% for approximately 7-1/2 minutes. If demand has not been satisfied after 7-1/2 minutes, motor runs at 100% until demand is satisfied.
- Once demand is met, motor ramps down to stop.



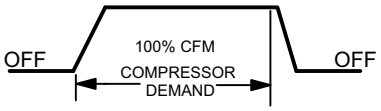

**Ramping Option C**

- Motor runs at 100% until demand is satisfied.
- Once demand is met, motor runs at 100% for 45 seconds then ramps down to stop.




**Ramping Option D**

- Motor runs at 100% until demand is satisfied.
- Once demand is met, motor ramps down to stop.




**Switches 11, 12 and 13 -- Heating Mode Blower Speed --** The switches are factory set to the OFF position which provides factory default heat speed. Refer to table 10 for switches 11, 12 and 13 that provided the corresponding increases or decrease to both high and low heat demand.

**TABLE 10**
**Heating Mode Blower Speeds**

| Heat Speed | Switch 11 | Switch 12 | Switch 13 |
|---|---|---|---|
| Increase 24% | On | On | On |
| Increase 18% | On | On | Off |
| Increase 12% | On | Off | On |
| Increase 6% | On | Off | Off |
| Factory Default | Off | Off | Off |
| Decrease 6% | Off | Off | On |
| Decrease 12% | Off | On | Off |
| Decrease18% | Off | On | On |

**Switches 14 and 15 -- Continuous Blower Speed --** Table 11 provides continuous blower speed adjustments that will result from different switch settings.

**TABLE 11**
**Continuous Blower Speed**

| Continuous Blower Speed | Switch 14 | Switch 15 |
|---|---|---|
| 28% of High Cool Speed | Off | On |
| 38% of High Cool Speed (Factory) | Off | Off |
| 70% of High Cool Speed | On | Off |
| 100% of High Cool Speed | On | On |

## BLOWER DATA

**SL280DF070V36A BLOWER PERFORMANCE (less filter)**

**0 through 0.8 in. w.g. (Heating) and 0 through 1.0 in. w.g. (Cooling) External Static Pressure Range**

| HEATING | | |
|---|---|---|
| [1] Heating Speed DIP Switch Settings | First Stage Heating Speed - cfm | Second Stage Heating Speed - cfm |
| +24% | 1065 | 1170 |
| +18% | 1010 | 1115 |
| +12% | 960 | 1055 |
| +6% | 910 | 1000 |
| Factory Default | 860 | 945 |
| –6% | 805 | 885 |
| –12% | 755 | 830 |
| –18% | 705 | 775 |

| COOLING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [1] Cooling Speed DIP Switch Settings | First Stage Cooling Speed - cfm | | | | Second Stage Cooling Speed - cfm | | | |
| | Low | Medium-Low | Medium-High | [2] High | Low | Medium-Low | Medium-High | [2] High |
| + | 745 | 870 | 1025 | 1075 | 1100 | 1240 | 1425 | 1515 |
| Factory Default | 665 | 780 | 925 | 985 | 1015 | 1115 | 1305 | 1380 |
| – | 590 | 690 | 815 | 865 | 900 | 1025 | 1170 | 1250 |

[1] Cooling and heating speeds are based on a combination of DIP switch settings on the furnace control. Refer to Installation Instructions for specific DIP Switch Settings.

[2] Factory default setting.

NOTES - The effect of static pressure is included in air volumes shown.
First stage HEAT is approximately 91% of the same second stage HEAT.
First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.
Continuous Fan Only speed is selectable at 28%, 38%, 70% and 100% of the selected second stage cooling speed - minimum 500 cfm.
Lennox Harmony III™ Zone Control Applications - Minimum blower speed is 425 cfm.

**SL280DF090V48B BLOWER PERFORMANCE (less filter)**

**0 through 0.8 in. w.g. (Heating) and 0 through 1.0 in. w.g. (Cooling) External Static Pressure Range**

| HEATING | | |
|---|---|---|
| [1] Heating Speed DIP Switch Settings | First Stage Heating Speed - cfm | Second Stage Heating Speed - cfm |
| +24% | 1360 | 1500 |
| +18% | 1285 | 1415 |
| +12% | 1220 | 1350 |
| +6% | 1135 | 1285 |
| Factory Default | 1075 | 1200 |
| –6% | 1030 | 1110 |
| –12% | 960 | 1050 |
| –18% | 890 | 975 |

| COOLING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [1] Cooling Speed DIP Switch Settings | First Stage Cooling Speed - cfm | | | | Second Stage Cooling Speed - cfm | | | |
| | Low | Medium-Low | Medium-High | [2] High | Low | Medium-Low | Medium-High | [2] High |
| + | 740 | 905 | 1040 | 1220 | 1085 | 1330 | 1545 | 1730 |
| Factory Default | 690 | 820 | 950 | 1110 | 990 | 1200 | 1400 | 1,595 |
| – | 610 | 745 | 855 | 1005 | 895 | 1075 | 1270 | 1460 |

[1] Cooling and heating speeds are based on a combination of DIP switch settings on the furnace control. Refer to Installation Instructions for specific DIP Switch Settings.

[2] Factory default setting.

NOTES - The effect of static pressure is included in air volumes shown.
First stage HEAT is approximately 91% of the same second stage HEAT.
First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.
Continuous Fan Only speed is selectable at 28%, 38%, 70% and 100% of the selected second stage cooling speed - minimum 500 cfm.
Lennox Harmony III™ Zone Control Applications - Minimum blower speed is 455 cfm.

## BLOWER DATA

**SL280DF090V60C BLOWER PERFORMANCE (less filter)**

**0 through 0.8 in. w.g. (Heating) and 0 through 1.0 in. w.g. (Cooling) External Static Pressure Range**

| HEATING | | |
|---|---|---|
| [1] Heating Speed DIP Switch Settings | First Stage Heating Speed - cfm | Second Stage Heating Speed - cfm |
| +24% | 1540 | 1695 |
| +18% | 1465 | 1615 |
| +12% | 1390 | 1530 |
| +6% | 1320 | 1450 |
| Factory Default | 1245 | 1365 |
| –6% | 1170 | 1285 |
| –12% | 1095 | 1205 |
| –18% | 1020 | 1120 |

| COOLING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [1] Cooling Speed DIP Switch Settings | First Stage Cooling Speed - cfm | | | | Second Stage Cooling Speed - cfm | | | |
| | Low | Medium-Low | Medium-High | [2] High | Low | Medium-Low | Medium-High | [2] High |
| + | 1125 | 1250 | 1400 | 1590 | 1585 | 1770 | 2000 | 2275 |
| Factory Default | 1020 | 1135 | 1285 | 1445 | 1420 | 1610 | 1845 | 2,050 |
| – | 900 | 1005 | 1155 | 1280 | 1305 | 1395 | 1645 | 1875 |

[1] Cooling and heating speeds are based on a combination of DIP switch settings on the furnace control. Refer to Installation Instructions for specific DIP Switch Settings.

[2] Factory default setting.

NOTES - The effect of static pressure is included in air volumes shown.
First stage HEAT is approximately 91% of the same second stage HEAT.
First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.
Continuous Fan Only speed is selectable at 28%, 38%, 70% and 100% of the selected second stage cooling speed - minimum 500 cfm.
Lennox Harmony III™ Zone Control Applications - Minimum blower speed is 480 cfm.

**SL280DF110V60C BLOWER PERFORMANCE (less filter)**

**0 through 0.8 in. w.g. (Heating) and 0 through 1.0 in. w.g. (Cooling) External Static Pressure Range**

| HEATING | | |
|---|---|---|
| [1] Heating Speed DIP Switch Settings | First Stage Heating Speed - cfm | Second Stage Heating Speed - cfm |
| +24% | 1645 | 1810 |
| +18% | 1565 | 1720 |
| +12% | 1485 | 1635 |
| +6% | 1405 | 1545 |
| Factory Default | 1325 | 1460 |
| –6% | 1245 | 1370 |
| –12% | 1170 | 1285 |
| –18% | 1090 | 1195 |

| COOLING | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| [1] Cooling Speed DIP Switch Settings | First Stage Cooling Speed - cfm | | | | Second Stage Cooling Speed - cfm | | | |
| | Low | Medium-Low | Medium-High | [2] High | Low | Medium-Low | Medium-High | [2] High |
| + | 1075 | 1225 | 1370 | 1530 | 1500 | 1755 | 1915 | 2120 |
| Factory Default | 945 | 1120 | 1230 | 1385 | 1360 | 1585 | 1770 | 1960 |
| – | 880 | 985 | 1135 | 1235 | 1225 | 1405 | 1595 | 1760 |

[1] Cooling and heating speeds are based on a combination of DIP switch settings on the furnace control. Refer to Installation Instructions for specific DIP Switch Settings.

[2] Factory default setting.

NOTES - The effect of static pressure is included in air volumes shown.
First stage HEAT is approximately 91% of the same second stage HEAT.
First stage COOL (two-stage air conditioning units only) is approximately 70% of the same second stage COOL speed position.
Continuous Fan Only speed is selectable at 28%, 38%, 70% and 100% of the selected second stage cooling speed - minimum 500 cfm.
Lennox Harmony III™ Zone Control Applications - Minimum blower speed is 485 cfm.

**On-Board Links**

***Note:*** *In icomfort ™ systems with a conventional outdoor unit (non-communicating), the on-board clippable links must be set to properly configure the system.*

**⚠WARNING**

**Carefully review all configuration information provided. Failure to properly set DIP switches, jumpers and on-board links can result in improper operation!**

**On-Board Link W914 Dehum or Harmony (R to DS)**

On-board link W914, is a clippable connection between terminals R and DS on the integrated control. W914 must be cut when the furnace is installed with either the Harmony III™ zone control or a thermostat which features humidity control. If the link is left intact the PMW signal from the Harmony III control will be blocked and also lead to control damage. Refer to table 12 for operation sequence in applications including SL280DFV, a thermostat which features humidity control and a single-speed outdoor unit. Table 13 gives the operation sequence in applications with a two-speed outdoor unit.

**On-Board Link W951 Heat Pump (R to O)**

On-board link W951 is a clippable connection between terminals R and O on the integrated control. W951 must be cut when the furnace is installed in applications which include a heat pump unit and a thermostat which features dual fuel use. If the link is left intact, terminal "O" will remain energized eliminating the HEAT MODE in the heat pump.

**On-Board Link W915 2 Stage Compr (Y1 to Y2)**

On-board link W915 is a clippable connection between terminals Y1 and Y2 on the integrated control. W915 must be cut if two-stage cooling will be used. If the Y1 to Y2 link is not cut the outdoor unit will operate in second-stage cooling only.

**TABLE 12**

**SL280DFV, Non-Communicating Thermostat with Humidity Control Feature and Single-Stage Outdoor Unit**

| OPERATING SEQUENCE | | SYSTEM DEMAND | | | | | | | SYSTEM RESPONSE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| System Condition | Step | Thermostat Demand | | | | | Relative Humidity | | Compressor | Blower CFM (COOL) | Comments |
| | | Y1 | O | G | W 1 | | Status | D | | | |
| *NO CALL FOR DEHUMIDIFICATION* | | | | | | | | | | | |
| Normal Operation | 1 | On | On | On | | | Acceptable | 24 VAC | High | 100% | Compressor and indoor blower follow thermostat demand |
| *BASIC MODE (only active on a Y1 thermostat demand)* | | | | | | | | | | | |
| Normal Operation | 1 | On | On | On | | | Acceptable | 24 VAC | High | 100% | ComfortSense® 7000 thermostat energizes Y1 and de-energizes D on a call for de-humidification |
| Dehumidification Call | 2 | On | On | On | | | Demand | 0 VAC | High | 60%, 65%, 70%* | |
| *PRECISION MODE (operates independent of a Y1 thermostat demand)* | | | | | | | | | | | |
| Normal Operation | 1 | On | On | On | | | Acceptable | 24 VAC | High | 100% | Dehumidification mode begins when humidity is greater than set point |
| Dehumidification call | 2 | On | On | On | | | Demand | 0 VAC | High | 60%, 65%, 70%* | |
| Dehumidification call ONLY | 1 | On | On | On | | | Demand | 0 VAC | High | 60%, 65%, 70%* | ComfortSense® 7000 thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint** |
| | Jumpers at indoor unit with a single stage outdoor unit<br>With Condensing unit - Cut W914 (R to DS) on SureLight® board<br>With Heat Pump - Cut W914 (R to DS) & W951 (R to O) on SureLight® board | | | | | | | | | | |

*ComfortSense® 7000 thermostat to use for this application - Y2081 4 heat / 2 cool*

**Dehumidification blower speed is 70% of COOL speed for all units .*

***In Precision mode, ComfortSense® 7000 thermostat will maintain room temperature up to 2 °F (1.2°C) cooler than room setting.*

**TABLE 13**
**SL280DFV, Non-Communicating Thermostat with Humidity Control Feature and Two-Stage Outdoor Unit**

| OPERATING SEQUENCE | | SYSTEM DEMAND | | | | | | | | SYSTEM RESPONSE | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| System Condition | Step | Thermostat Demand | | | | | | Relative Humidity | | Compressor | Blower CFM (COOL) | Comments |
| | | Y1 | Y2 | O | G | W1 | W2 | Status | D | | | |
| **NO CALL FOR DEHUMIDIFICATION** | | | | | | | | | | | | |
| Normal Operation - Y1 | 1 | On | | On | On | | | Acceptable | 24 VAC | Low | 60%, 65% 70%* | Compressor and indoor blower follow thermostat demand |
| Normal Operation - Y2 | 2 | On | On | On | On | | | Acceptable | 24 VAC | High | 100% | |
| **ROOM THERMOSTAT CALLS FOR FIRST STAGE COOLING** | | | | | | | | | | | | |
| *BASIC MODE (only active on a Y1 thermostat demand)* | | | | | | | | | | | | |
| Normal Operation | 1 | On | | On | On | | | Acceptable | 24 VAC | Low | 60%, 65% 70%* | ComfortSense® 7000 thermostat energizes Y2 and de-energizes D on a call for de-humidification |
| Dehumidification Call | 2 | On | On | On | On | | | Demand | 0 VAC | High | 60%, 65% 70%** | |
| *PRECISION MODE (operates independent of a Y1 thermostat demand)* | | | | | | | | | | | | |
| Normal Operation | 1 | On | | On | On | | | Acceptable | 24 VAC | Low | 60% 65% 70%* | Dehumidification mode begins when humidity is greater than set point |
| Dehumidification call | 2 | On | On | On | On | | | Demand | 0 VAC | High | 60% 65% 70%** | |
| Dehumidification call ONLY | 1 | On | On | On | On | | | Demand | 0 VAC | High | 60% 65% 70%** | ComfortSense® 7000 thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint*** |
| **ROOM THERMOSTAT CALLS FOR FIRST AND SECOND STAGE COOLING** | | | | | | | | | | | | |
| *BASIC MODE (only active on a Y1 thermostat demand)* | | | | | | | | | | | | |
| Normal Operation | 1 | On | On | On | On | | | Acceptable | 24 VAC | High | 100% | ComfortSense® 7000 thermostat energizes Y2 and de-energizes D on a call for de-humidification |
| Dehumidification Call | 2 | On | On | On | On | | | Demand | 0 VAC | High | 60% 65% 70%** | |
| *PRECISION MODE (operates independent of a Y1 thermostat demand)* | | | | | | | | | | | | |
| Normal Operation | 1 | On | | On | On | | | Acceptable | 24 VAC | Low | 60% 65% 70%* | Dehumidification mode begins when humidity is greater than set point |
| Dehumidification call | 2 | On | On | On | On | | | Demand | 0 VAC | High | 60% 65% 70%** | |
| Dehumidification call ONLY | 1 | On | On | On | On | | | Demand | 0 VAC | High | 60% 65% 70%** | ComfortSense® 7000 thermostat will try to maintain room humidity setpoint by allowing the room space to maintain a cooler room thermostat setpoint*** |
| | Jumpers at indoor unit with a two stage outdoor unit<br>Cut factory jumper from Y1 to Y2 or cut W915 (Y1 to Y2)<br>With Condensing unit - Cut W914 (R to DS) on SureLight® board<br>With Heat Pump - Cut W914 (R to DS) & W951 (R to O) on SureLight® control | | | | | | | | | | | |

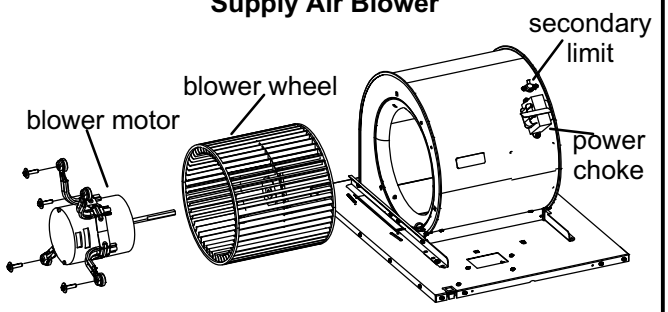
*ComfortSense® 7000 thermostat to use for this application - Y2081 4 heat / 2 cool*

**Normal operation first stage cooling blower speed is 70% COOL speed.*

***Dehumidification blower speed is, reduced to 70% of COOL.*

****In Precision mode, ComfortSense® 7000 thermostat will maintain room temperature up to 2 °F (1.2°C) cooler than room setting.*

**B- Indoor Blower Motor**




**To Remove Blower From Unit:**
1. Disconnect Power, 2. Remove internal flue pipe and chase 3. Remove Control Box 4. Remove Bolts. 5. Unplug Motor Wires From Control Board. Then Slide Out Front of Unit.

**FIGURE 6**

## ⚠WARNING

**During blower operation, the ECM motor emits energy that may interfere with pacemaker operation. Interference is reduced by both the sheet metal cabinet and distance.**

The motor communicates with the integrated control via a 2-way serial connection. The motor receives all necessary functional parameters from the integrated control and does not rely on a factory program like traditional variable speed motors. SL280DFV units use a three-phase, electronically controlled D.C. brushless motor (controller converts single phase a.c. to three phase D.C.), with a permanent-magnet-type rotor (figure 7). Because this motor has a permanent magnet rotor it does not need brushes like conventional D.C. motors.

The stator windings are split into three poles which are electrically connected to the controller. This arrangement allows motor windings to turn on and off in sequence by the controller.

## ⚠ IMPORTANT

**Earlier ECM motors used on other Lennox furnace models are not interchangeable with motors used on the SL280DF furnace line.**

A solid-state controller is permanently attached to the motor. The controller is primarily an A.C. to D.C. converter. Converted D.C. power is used to drive the motor. The controller contains a microprocessor which monitors varying conditions inside the motor (such as motor workload).

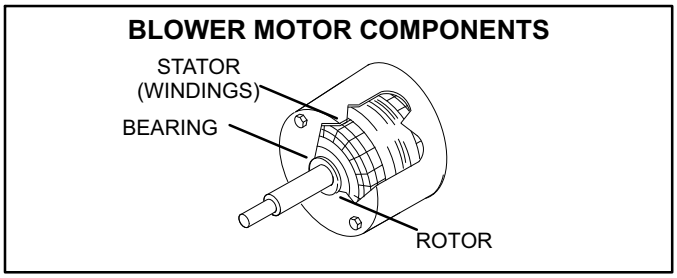



**FIGURE 7**

The controller uses sensing devices to sense what position the rotor is in at any given time. By sensing the position of the rotor and then switching the motor windings on and off in sequence, the rotor shaft turns the blower.

All SL280DFV blower motors use single phase power. An external run capacitor is not used. The motor uses permanently lubricated ball-type bearings.

**Internal Operation**

The motor is controlled via serial communication between the integrated control on the furnace and the controller attached to the motor shell. The messages sent back and forth between the two controls serve to communicate rotational direction, demand, motor size, current draw, torque, and rpm, among other variables.

Motor rpm is continually adjusted internally to maintain constant static pressure against the blower wheel. The controller monitors the static work load on the motor and motor amp-draw to determine the amount of rpm adjustment. Blower rpm may be adjusted any amount in order to maintain a constant cfm as shown in Blower Ratings Tables. The cfm remains relatively stable over a broad range of static pressure. Since the blower constantly adjusts rpm to maintain a specified cfm, motor rpm is not rated. Hence, the terms “cool speed”, “heat speed ” or “speed tap” in this manual, on the unit wiring diagram and on blower B3, refer to blower cfm regardless of motor rpm.

**Initial Power Up**

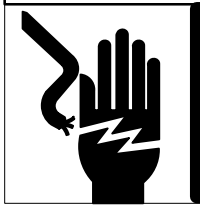
When line voltage is applied to B3, there will be a large inrush of power lasting less than 1/4 second. This inrush charges a bank of DC filter capacitors inside the controller. If the disconnect switch is bounced when the disconnect is closed, the disconnect contacts may become welded. Try not to bounce the disconnect switch when applying power to the unit.

**Motor Start-Up**

When B3 begins start-up, the motor gently vibrates back and forth for a moment. This is normal. During this time the electronic controller is determining the exact position of the rotor. Once the motor begins turning, the controller slowly eases the motor up to speed (this is called “soft-start”). The motor may take as long as 10-15 seconds to reach full speed. If the motor does not reach 200 rpm within 13 seconds, the motor shuts down. Then the motor will immediately attempt a restart. The shutdown feature provides protection in case of a frozen bearing or blocked blower wheel. The motor may attempt to start eight times. If the motor does not start after the eighth try, the controller locks out. Reset controller by momentarily turning off power to unit.

The DC filter capacitors inside the controller are connected electrically to the motor supply wires. The capacitors take approximately 5 minutes to discharge when the disconnect is opened. For this reason it is necessary to wait at least 5 minutes after turning off power to the unit before attempting to service motor.

**⚠ DANGER**



**Disconnect power from unit and wait at least five minutes to allow capacitors to discharge before attempting to service motor. Failure to wait may cause personal injury or death.**

**Power Choke (L13)**

A choke coil is used on SL280DFV 4 and 5 ton units equipped with 1 hp motors. The choke is located on the blower housing and is used to suppress transient current spikes.

**Troubleshooting**

To verify motor operation see steps below:

1- Remove J48 (5 pin power plug) from P48 on the motor.

2- With the power on at the furnace and door switch depressed, use a test meter to verify 120V between pins 4 and 5 on J48.

3- Reconnect J48 to P48 on the motor.

4- Remove J49 (4 pin low voltage connector) from P49 on the motor.

5- Using test jumpers, apply 24V to pins 3 and 4 on P49 on the motor.

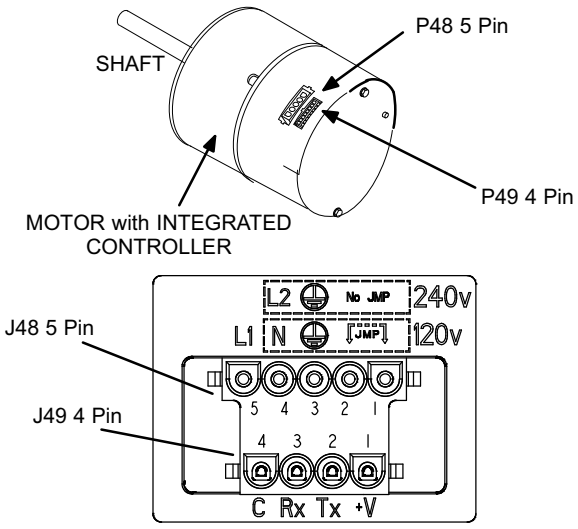
***Note:*** *Do not apply 24V to pins 2 and 4 on P49. Doing so will cause permanent damage to the motor.*

6- Motor should run at 75%.

7- Test is complete. Remove jumpers and reconnect plugs.

Another option is to use the TECMate PRO motor tester with the 16 to 4 pin adaptor. The use of the TECMate PRO isolates the motor from the integrated control. Follow the instructions provided with the kit. If the motor runs do not replace.

## BLOWER B3 HARNESS CONNECTORS




| J49 4 Pin Control Connector | |
|---|---|
| PIN | DESCRIPTION |
| 1 | 12V INPUT |
| 2 | SERIAL DATA OUTPUT |
| 3 | SERIAL DATA INPUT |
| 4 | COMMON |

| J48 5 Pin Line Voltage Connector | |
|---|---|
| PIN | DESCRIPTION |
| 1 | JUMPER PIN 1 TO PIN 2 FOR 120VAC LINE INPUT ONLY *** |
| 2 | |
| 3 | CHASSIS GROUND |
| 4 | AC LINE |
| 5 | AC LINE |

**FIGURE 8**

## BLOWER B3 HARNESS CONNECTORS

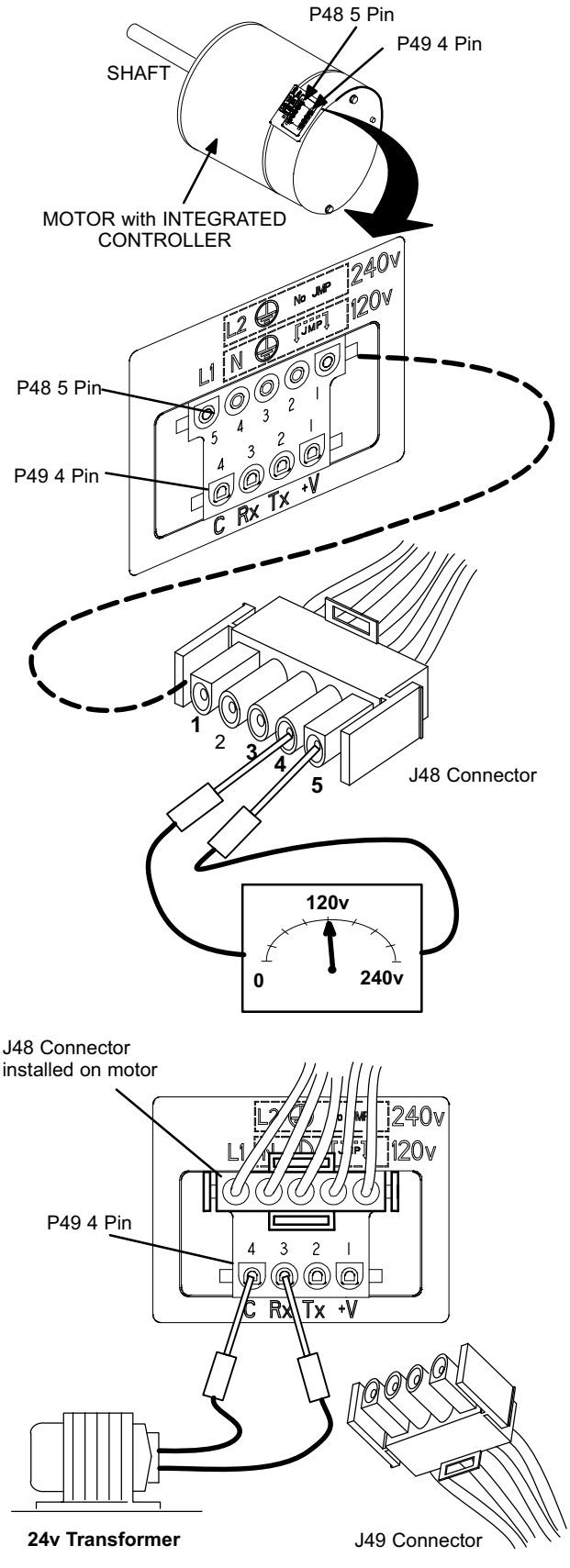



**FIGURE 9**

**C- Heating Components**

**1. Ignitor**

The SureLight® ignitor is made of durable silicon nitride. Ignitor longevity is enhanced by controlling voltage to the ignitor. The integrated control provides a regulated 120 volts to the ignitor for a consistent ignition and long ignitor life. Ohm value should be 39 to 70. See figure 10 for ignitor location and figure 11 for ignitor check out.

***NOTE -*** *The SL280DFV(X) furnace contains electronic components that are polarity sensitive. Make sure that the furnace is wired correctly and is properly grounded.*

**2. Flame Sensor**

A flame sensor is located on the left side of the burner support. See figure 10. The sensor is tip protrudes into the flame envelope of the left-most burner. The sensor can be removed for service without removing any part of the burners. During operation, flame is sensed by current passed through the flame and sensing electrode. The SureLight control allows the gas valve to remain open as long as flame signal is sensed. To check flame sense signal use the push-button found on the integrated control and go to Field Test Mode. The menu will display the flame signal. See table 14 for flame signal.

**TABLE 14**
**Flame Signal in Microamps**

| Normal | Low | Drop Out |
|---|---|---|
| 2.6 or greater | 2.5 or less | 1.1 |

**3. Gas Valve**

The valve (figure 13 or 14) is internally redundant to assure safety shut-off. If the gas valve must be replaced, the same type valve must be used.

24VAC terminals and gas control knob are located on the valve. A wire harness connects the terminals from the gas valve to the electronic ignition control. 24V applied to the terminals energizes the valve.

Inlet and outlet pressure taps are located on the valve. A regulator adjustment screw is located on the valve.

LPG change over kits are available from Lennox. Kits include burner orifices and a gas valve.

**4. Flame Rollout Switches (S47)**

Flame rollout switch is a high temperature limit located on top of the burner box, one on each side.- See figure 10. The limit is a N.C. SPST manual-reset limit connected in series with the secondary limit S21. When S47 senses rollout, the circuit breaks and the ignition control immediately stops ignition and closes the gas valve. Rollout can be caused by a blocked heat exchanger, flue or lack of combustion air. The switch is factory set to trip (open) at 210°F and cannot be adjusted. The switch can be manually reset. To manually reset a tripped switch, push the reset button located on the control.

**5. Burners**

All units use inshot burners. Burners are factory set and require no adjustment. Always operate the unit with the burner box front panel in place. Each burner uses an orifice (see table 19 for orifice size) that is precisely matched to the burner input. Burners can be removed as a one piece assembly for service. If burner assembly has been removed, it is critical to align center of each burner to the center of the clamshell when re-installing. See more detail in Section VI- MAINTENANCE sub-section E- Heat Exchanger and Burners.

**6. Primary Limit Control (S10)**

The primary limit (S10) is located in the heating vestibule panel. When excess heat is sensed in the heat exchanger, the limit will open. If the limit is open, the furnace control energizes the supply air blower and closes the gas valve. The limit automatically resets when unit temperature returns to normal. The switch must reset within three minutes or the SureLight control will go into Watch guard for one hour. The switch is factory set and cannot be adjusted. The switch may have a different set point for each unit model number. See Lennox Repair Parts Handbook if limit switch must be replaced,

**7. Secondary Limit Controls (S21)**

The secondary limit (S21) is located in the blower compartment. See figure 6. When excess heat is sensed in the blower compartment, the limit will open. If the limit is open, the furnace control energizes the supply air blower and closes the gas valve. The limit automatically resets when unit temperature returns to normal. The switch must reset within three minutes or the SureLight control will go into Watch guard for one hour. The switch is factory set and cannot be adjusted.

**SL280DFV HEATING COMPONENTS**

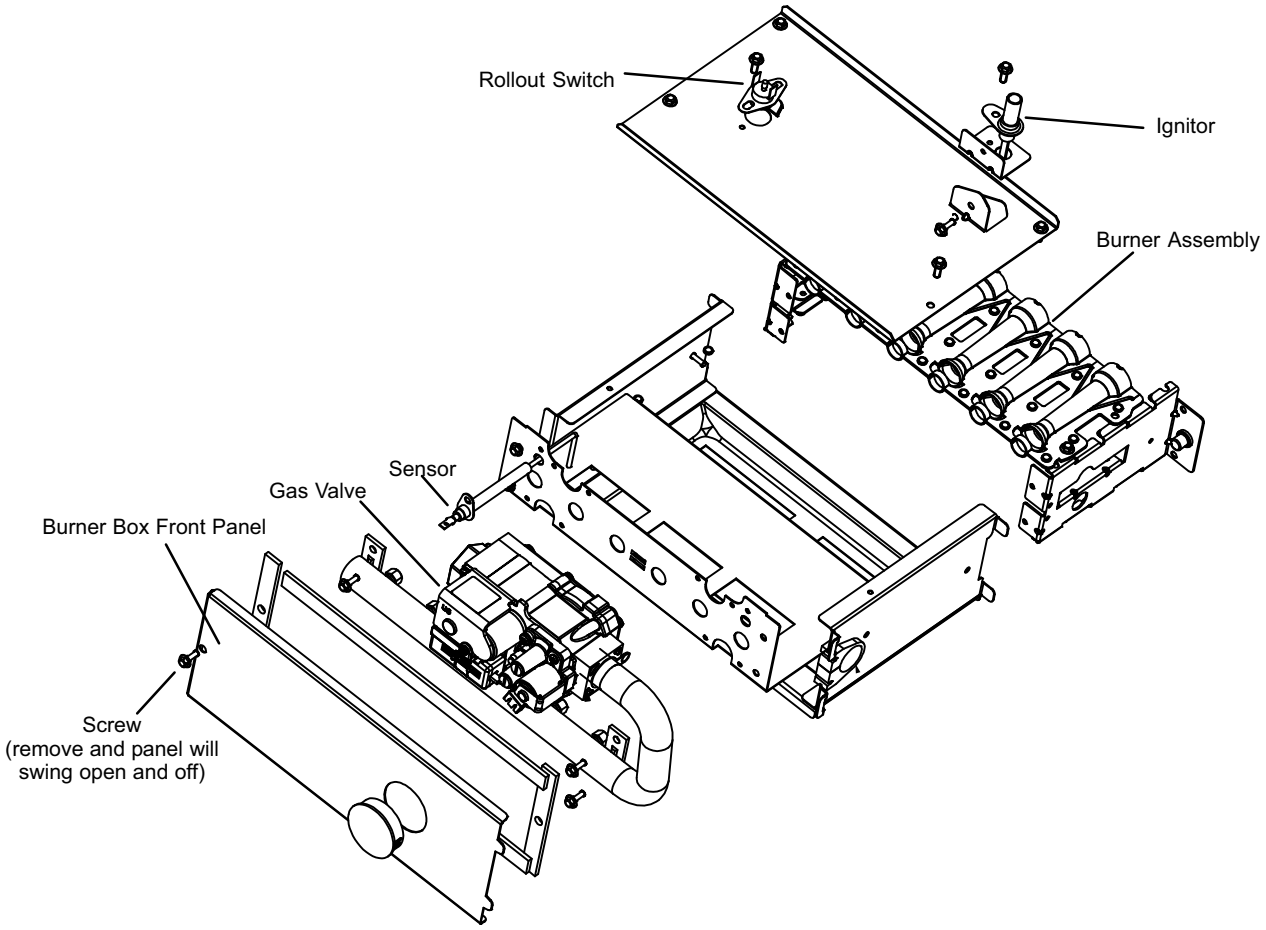



**FIGURE 10**

## SL280DF Ignitor Check Out

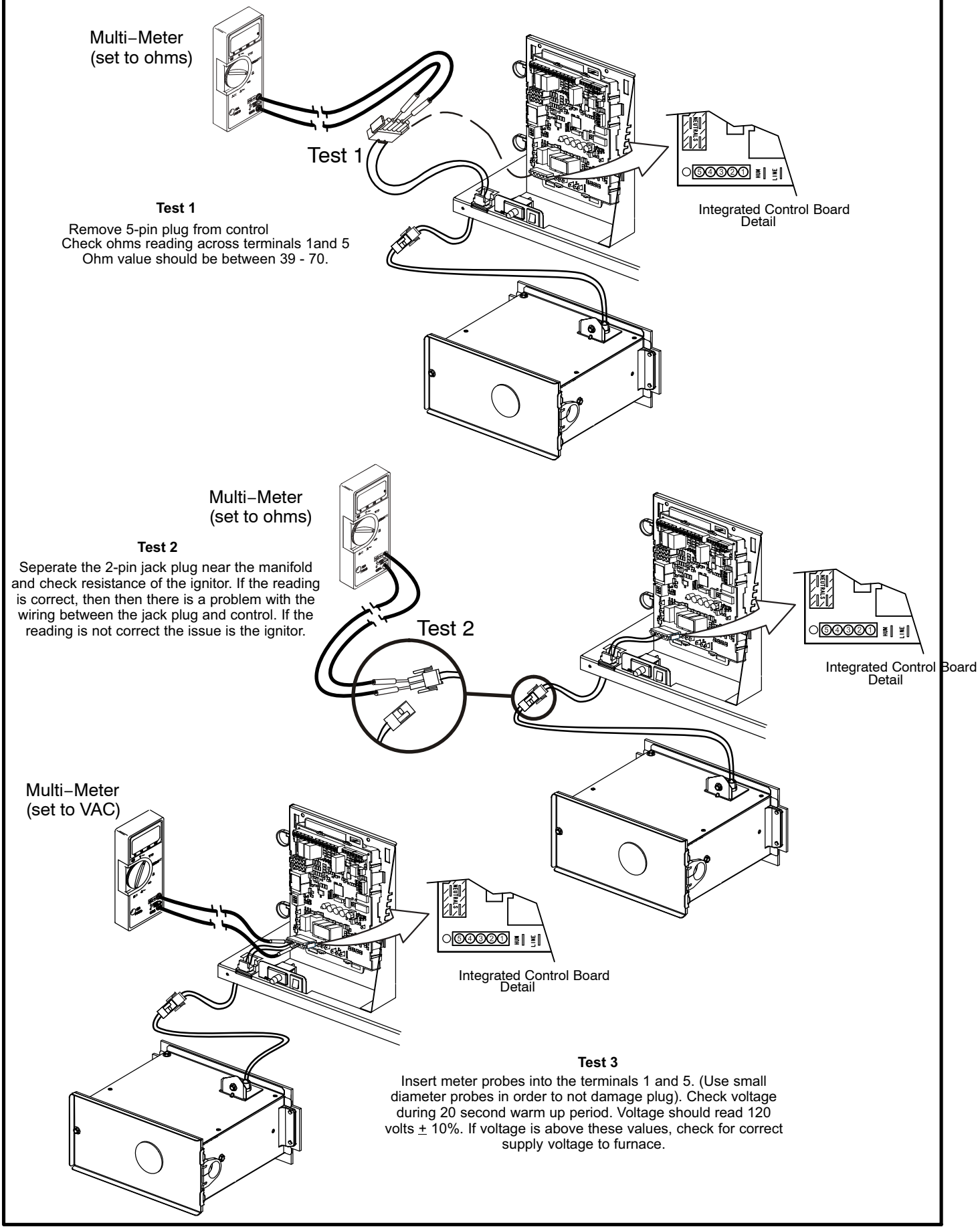

Multi−Meter
(set to ohms)
Test 1
Integrated Control Board
Detail
Test 1
Remove 5-pin plug from control
Check ohms reading across terminals 1and 5
Ohm value should be between 39 - 70.
Multi−Meter
(set to ohms)
Test 2
Integrated Control Board
Detail
Test 2
Seperate the 2-pin jack plug near the manifold and check resistance of the ignitor. If the reading is correct, then then there is a problem with the wiring between the jack plug and control. If the reading is not correct the issue is the ignitor.
Multi−Meter
(set to VAC)
Integrated Control Board
Detail
Test 3
Insert meter probes into the terminals 1 and 5. (Use small diameter probes in order to not damage plug). Check voltage during 20 second warm up period. Voltage should read 120 volts ± 10%. If voltage is above these values, check for correct supply voltage to furnace.

**FIGURE 11**

**8. Combustion Air Inducer (B6)**

All units use a two-stage combustion air inducer to move air through the burners and heat exchanger during heating operation. The blower uses a 120VAC motor. The motor operates during all heating operation and is controlled by furnace / blower control A92. The inducer also operates for 15 seconds before burner ignition (pre-purge) and for 5 seconds after the gas valve closes (post-purge). The inducer operates on low speed during first-stage heat, then switches to high speed for second stage heat.

***NOTE -*** *Each furnace model uses a unique CAI. Refer to Lennox Repair Parts listing for correct inducer for replacement.*

A pressure switch connected to the combustion air inducer orifice plate is used to prove inducer operation. The combustion air inducer orifice will be different for each model. See table 15 for orifice sizes. The switch monitors air pressure in the inducer housing. During normal operation, the pressure in the housing is negative. If pressure becomes less negative (signifying an obstruction) the proving switch opens. When the proving switch opens, the furnace control (A92) immediately closes the gas valve to prevent burner operation.

**TABLE 15**

| SL280DFV Unit | C.A.I. Orifice Size |
|---|---|
| -070 | 1.375 |
| -090 | 1.625 |
| -110 | 1.844 |

**9. Combustion Air Inducer Pressure Switch (S18)**

S18 is a dual combustion air pressure switch (first and second stage) located on the combustion air inducer orifice bracket. The switch is connected to the combustion air inducer housing by means of a flexible silicone hose. It monitors negative air pressure in the combustion air inducer housing.

The switches are a single-pole single-throw proving switch electrically connected to the furnace control. The purpose of the switch is to prevent burner operation if the combustion air inducer is not operating or if the flue becomes obstructed.

On heat demand (first or second stage) the switch senses that the combustion air inducer is operating. It closes a circuit to the furnace control when pressure inside the combustion air inducer decreases to a certain set point.

Set points vary depending on unit size. See table 16. The pressure sensed by the switch is negative relative to atmospheric pressure. If the flue becomes obstructed during operation, the switch senses a loss of negative pressure (pressure becomes more equal with atmospheric pressure) and opens the circuit to the furnace control and gas valve. A bleed port on the switch allows relatively dry air in the vestibule to purge switch tubing, to prevent condensate build up.

***NOTE -*** *The switch is factory set and is not field adjustable. It is a safety shut-down control in the furnace and must not be by-passed for any reason. If switch is closed or by-passed, the control will not initiate ignition at start up.*

**COMBUSTION AIR PRESSURE SWITCH**

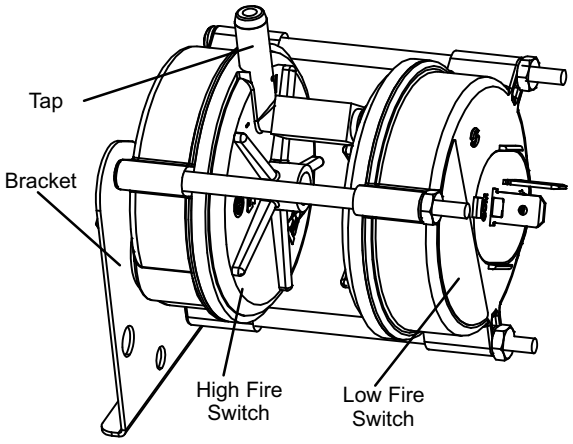



**FIGURE 12**

**TABLE 16**

| SL280DFV Unit | Set Point High Heat | Set Point Low Heat |
|---|---|---|
| -070 | 0.55 | 0.20 |
| -090 | 0.55 | 0.20 |
| -110 | 0.60 | 0.25 |

## II-PLACEMENT AND INSTALLATION

Make sure unit is installed in accordance with installation instructions and applicable codes.

## III-START-UP

**A-Preliminary and Seasonal Checks**

1 - Inspect electrical wiring, both field and factory installed for loose connections. Tighten as required.

2 - Check voltage at disconnect switch. Voltage must be within range listed on the nameplate. If not, consult the power company and have voltage condition corrected before starting unit.

**B-Heating Start-Up**

**⚠ WARNING**

**Shock and burn hazard.**

**SL280DFV units are equipped with a hot surface ignition system. Do not attempt to light manually.**

1 - **STOP**! Read the safety information at the beginning of this section.

2 - Set the thermostat to the lowest setting.

3 - Turn off all electrical power to the unit.

4 - This furnace is equipped with an ignition device which automatically lights the burners. Do **not** try to light the burners by hand.

5 - Remove the upper access panel.

6 - Turn switch on gas valve to **OFF**. Do not force. See figure 13 or 14.

7 - Wait five minutes to clear out any gas. If you then smell gas, STOP! Immediately call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions. If you do not smell gas go to next step.

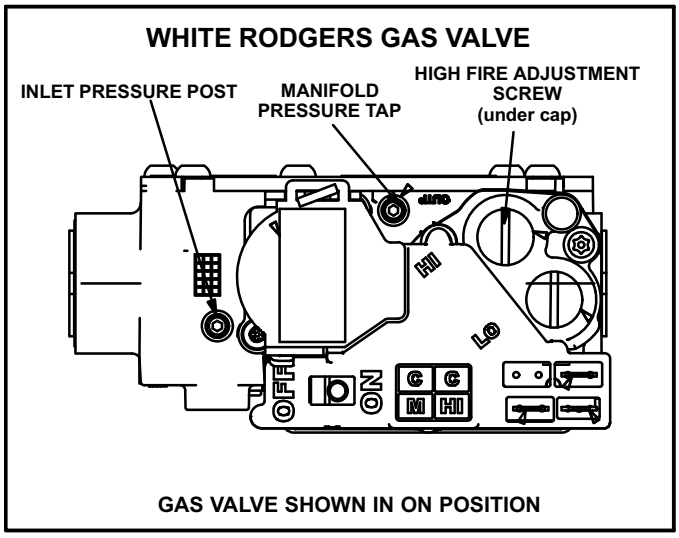



**FIGURE 13**

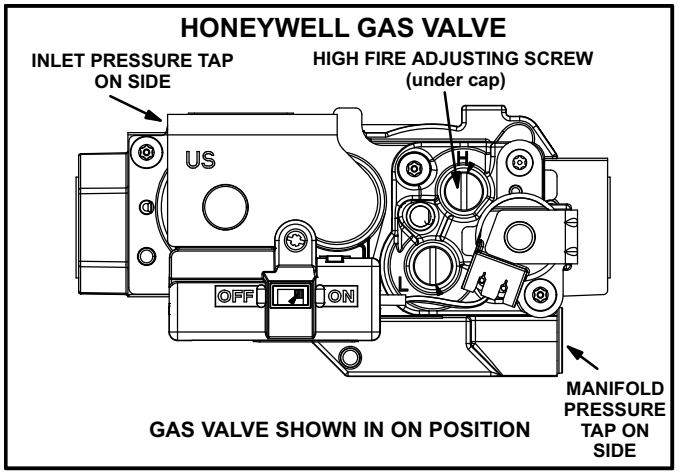



**FIGURE 14**

8 - Turn switch on gas valve to **ON**. Do not force. See figure 13 or 14.

9 - Replace the upper access panel.

10- Turn on all electrical power to to the unit.

11- Set the thermostat to desired setting.

*NOTE - When unit is initially started, steps 1 through 11 may need to be repeated to purge air from gas line.*

**Turning Off Gas To Unit**

1 - Set thermostat to lowest setting.

2 - Turn off all electrical power to unit if service is to be performed.

3 - Remove access panel.

4 - Turn switch on gas valve to **OFF**. Do not force. See figure 13 or 14.

5 - Replace access panel.

**Failure To Operate**

If the unit fails to operate, check the following:

1 - Is the thermostat calling for heat?

2 - Are access panels securely in place?

3 - Is the main disconnect switch closed?

4 - Is there a blown fuse or tripped circuit breaker?

5 - Is the filter dirty or plugged? Dirty or plugged filters will cause the limit control to shut the unit off.

6 - Is gas turned on at the meter?

7 - Is the manual main shut-off valve open?

8 - Is the internal manual shut-off valve open?

9 - Is the unit ignition system in lock out? If the unit locks out again, call the service technician to inspect the unit for blockages.

10 -Is pressure switch closed? Obstructed flue will cause unit to shut off at pressure switch. Check flue and outlet for blockages.

11 -Are flame rollout switches tripped? If flame rollout switches are tripped, call the service technician for inspection.

**C-Safety or Emergency Shutdown**

Turn off unit power. Close manual and main gas valves.

**D-Extended Period Shutdown**

Turn off thermostat or set to "UNOCCUPIED" mode. Close all gas valves (both internal and external to unit) to guarantee no gas leak into combustion chamber. Turn off power to unit. All access panels and covers must be in place and secured.

## IV-HEATING SYSTEM SERVICE CHECKS

**A-CSA Certification**

All units are CSA design certified without modifications. Refer to the SL280DFV Installation Instruction.

**B-Gas Piping**

**⚠ CAUTION**

**If a flexible gas connector is required or allowed by the authority that has jurisdiction, black iron pipe shall be installed at the gas valve and extend outside the furnace cabinet. The flexible connector can then be added between the black iron pipe and the gas supply line.**

**⚠ WARNING**

**Do not exceed 600 in-lbs (50 ft-lbs) torque when attaching the gas piping to the gas valve.**

Gas supply piping should not allow more than 0.5"W.C. drop in pressure between gas meter and unit. Supply gas pipe must not be smaller than unit gas connection.

Compounds used on gas piping threaded joints should be resistant to action of liquefied petroleum gases.

**C-Testing Gas Piping**

**⚠ IMPORTANT**

**In case emergency shutdown is required, turn off the main shut-off valve and disconnect the main power to unit. These controls should be properly labeled by the installer.**

When pressure testing gas lines, the gas valve must be disconnected and isolated. Gas valves can be damaged if subjected to more than 0.5 psig (14" W.C.). See figure 15. If the pressure is equal to or less than 0.5psig (14"W.C.), use the manual shut-off valve before pressure testing to isolate furnace from gas supply.

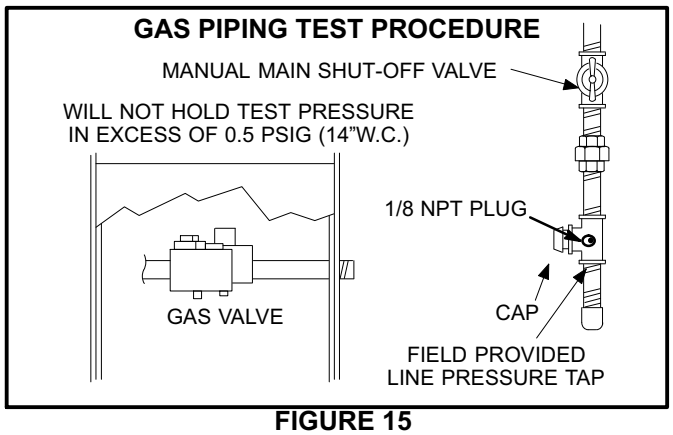



**FIGURE 15**

When checking piping connections for gas leaks, use preferred means. Kitchen detergents can cause harmful corrosion on various metals used in gas piping. Use of a specialty Gas Leak Detector is strongly recommended. It is available through Lennox under part number 31B2001. See Corp. 8411-L10, for further details.

Do not use matches, candles, flame or any other source of ignition to check for gas leaks.

**D-Testing Gas Supply Pressure**

***White Rodgers Gas Valve***

An inlet post located on the gas valve provides access to the supply pressure. See figure 13. Back out the 3/32 hex screw one turn, connect a piece of 5/16 tubing and connect to a manometer to measure supply pressure. See table 19 for supply line pressure.

***Honeywell Gas Valve***

A threaded plug on the inlet side of the gas valve provides access to the supply pressure tap. Remove the threaded plug, install a field-provided barbed fitting and connect a manometer to measure supply pressure. See table 19 for supply line pressure. Replace the threaded plug after measurements have been taken.

**E-Check Manifold Pressure**

After line pressure has been checked and adjusted, check manifold pressure. Move pressure gauge to outlet pressure tap located on unit gas valve (GV1). Checks of manifold pressure are made as verification of proper regulator adjustment. Manifold pressure can be measured at any time the gas valve is open and is supplying gas to the unit. See table 19 for normal operating manifold pressure.

**⚠ IMPORTANT**

**For safety, connect a shut-off valve between the manometer and the gas tap to permit shut off of gas pressure to the manometer.**

The gas valve is factory set and should not require adjustment. All gas valves are factory regulated.

**Manifold Adjustment Procedure:**

1 - Connect test gauge to manifold pressure post (figure 13) or tap (figure 14) on gas valve.
2 - Ignite unit on high fire and let run for 5 minutes to allow for steady state conditions.
3 - After allowing unit to stabilize for 5 minutes, record manifold pressure and compare to value given in table 19.
4 - If necessary, make adjustments. Figures 13 and 14 show location of high fire adjustment screw.
5 - If an adjustment is made on high fire, re-check manifold pressure on low fire. *Do not adjust low fire manifold pressure.* If low fire manifold pressure is more than 1/2" above or below value specified in table 19, replace valve.

**⚠ IMPORTANT**

**For safety, shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to replace pressure tap plug.**

**F- Proper Gas Flow (Approximate)**

Furnace should operate at least 5 minutes before checking gas flow. Determine time in seconds for **two** revolutions of gas through the meter. (Two revolutions assures a more accurate time.) **Divide by two** and compare to time in table 17 below. If manifold pressure matches table 19 and rate is incorrect, check gas orifices for proper size and restriction.

*NOTE- To obtain accurate reading, shut off all other gas appliances connected to meter.*

**TABLE 17**

| GAS METER CLOCKING CHART | | | | |
|---|---|---|---|---|
| SL280DF Unit | Seconds for One Revolution | | | |
| | Natural | | LP | |
| | 1 cu ft Dial | 2 cu ft Dial | 1 cu ft Dial | 2 cu ft DIAL |
| -045 | 80 | 160 | 200 | 400 |
| -70 | 55 | 110 | 136 | 272 |
| -90 | 41 | 82 | 102 | 204 |
| -110 | 33 | 66 | 82 | 164 |
| -135 | 27 | 54 | 68 | 136 |
| Natural-1000 btu/cu ft LP-2500 btu/cu ft | | | | |

**⚠ IMPORTANT**

**For safety, shut unit off and remove manometer as soon as an accurate reading has been obtained. Take care to replace pressure tap plug.**

**G- Proper Combustion**

Furnace should operate minimum 15 minutes with correct manifold pressure and gas flow rate before checking combustion. See sections E- and F-. Take combustion sample beyond the flue outlet and compare to the table below. The maximum carbon monoxide reading should not exceed 50 ppm.

**TABLE 18**

| Firing Rate | $CO_2$% For Nat | $CO_2$% For L.P. |
|---|---|---|
| High Fire | 6.0 - 7.4 | 6.9 - 8.4 |
| Low Fire | 4.8 - 6.0 | 5.7 - 7.0 |
| **The carbon monoxide reading should not exceed 50 ppm.** | | |

**H-High Altitude**

The manifold pressure, gas orifice and pressure switch may require adjustment or replacement to ensure proper operation at higher altitudes. See table 19 for manifold pressures, table 20 for pressure switch kits and table 22 or 21 for gas conversion kits.

## Table 19
## Manifold Pressure Settings

| Unit Input | Gas | Orifice Size 0 - 7500 ft. | Orifice Size 7501 - 10,000 ft.[1] | Manifold Pressure in.wg. 0-4500 ft. | | Manifold Pressure in.wg. 4501-7500 ft. | | Manifold Pressure in.wg. 7501 - 10,000 ft.[2] | | Supply Line Pressure in. w.g. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Low Fire | High Fire | Low Fire | High Fire | Low Fire | High Fire | Min | Max |
| 070 | Natural | .063 | .055 | 1.7 | 3.5 | 1.6 | 3.4 | 1.7 | 3.5 | 4.5 | 13.0 |
| | LP/propane[3] | .039 | .037 | 4.9 | 10.0 | 4.9 | 10.0 | 4.9 | 10.0 | 11.0 | 13.0 |
| 090 | Natural | .063 | .055 | 1.7 | 3.5 | 1.5 | 3.0 | 1.7 | 3.5 | 4.5 | 13.0 |
| | LP/propane[3] | .039 | .037 | 4.9 | 10.0 | 4.9 | 10.0 | 4.9 | 10.0 | 11.0 | 13.0 |
| 110 | Natural | .063 | .055 | 1.7 | 3.5 | 1.5 | 3.2 | 1.7 | 3.5 | 4.5 | 13.0 |
| | LP/propane[3] | .039 | .037 | 4.9 | 10.0 | 4.9 | 10.0 | 4.9 | 10.0 | 11.0 | 13.0 |

[1] This is the only permissible derate for these units.

[2] Natural gas high altitude orifice kit required.

[3] A natural to L.P. propane gas changeover kit is necessary to convert this unit. Refer to the changeover kit installation instruction for the conversion procedure.

NOTE - Units may be installed at altitudes up to 4500 ft. above sea level without modifications.

## TABLE 20
## High Altitude Pressure Switch

| Unit Input | High Altitude Pressure Switch Kit | | |
|---|---|---|---|
| | 0 - 4500 ft. | 4501 - 7500 ft. | 7501 - 10,000 ft. |
| 070 | No Change | No Change | 73W36 |
| 090 | No Change | 69W56 | 73W36 |
| 110 | No Change | 69W56 | 73W35 |

## TABLE 21
## Honeywell Gas Valve Conversion Kits

| Unit Input | High Altitude Natural Gas Orifice Kit | Natural Gas to LP/ Propane Kit | | LP/Propane to Natural Gas Kit |
|---|---|---|---|---|
| | 7501 - 10,000 ft. | 0 - 7500 ft. | 7501 - 10,000 ft. | 0 - 7500 ft. |
| 070 | 73W37 | 51W02 | 73W38 | 69W79 |
| 090 | 73W37 | 51W02 | 73W38 | 69W79 |
| 110 | 73W37 | 51W02 | 73W38 | 69W79 |

## TABLE 22
## White Rodgers Gas Valve Conversion Kits

| Unit Input | High Altitude Natural Gas Orifice Kit | Natural Gas to LP/ Propane Kit | | LP/Propane to Natural Gas Kit |
|---|---|---|---|---|
| | 7501 - 10,000 ft. | 0 - 7500 ft. | 7501 - 10,000 ft. | 0 - 7500 ft. |
| 070 | 73W37 | 77W07 | 77W11 | 77W09 |
| 090 | 73W37 | 77W07 | 77W11 | 77W09 |
| 110 | 73W37 | 77W07 | 77W11 | 77W09 |

## V-TYPICAL OPERATING CHARACTERISTICS

### A-Blower Operation and Adjustment

When the thermostat is set to "FAN ON," the indoor blower will run continuously at approximately 38% of the second-stage cooling speed when there is no cooling or heating demand.

When the SL280DFV is running on high fire or low fire (low fire is 91% of high fire), the indoor blower will run on the heating speed designated by the positions of DIP switches 11 and 12.

When the SL280DFV is running on second-stage cool or first-stage cool (second-stage cool is 70% of first-stage cool), the indoor blower will run on the cooling speed designated by the positions of DIP switches 5 and 6.

### B-Temperature Rise

Temperature rise for SL280DFV units depend on unit input, blower speed, blower horsepower and static pressure as marked on the unit rating plate. The blower speed must be set for unit operation within the range of "TEMP. RISE °F" listed on the unit rating plate for high fire and low fire.

**To Measure Temperature Rise:**

1 - Place plenum thermometers in the supply and return air plenums. Locate supply air thermometer in the first horizontal run of the plenum where it will not pick up radiant heat from the heat exchanger.

2 - Set thermostat to highest setting. Confirm unit is on high fire by checking rate.

3 - After plenum thermometers have reached their highest and steadiest readings, subtract the two readings. The difference should be in the range listed on the unit rating plate. If the temperature is too low, decrease blower speed.

4 - Repeat on low fire. *Do not adjust low fire manifold pressure.*

### C-External Static Pressure

1 - Tap locations shown in figure 16.

2 - Punch a 1/4" diameter hole in supply and return air plenums. Insert manometer hose flush with inside edge of hole or insulation. Seal around the hose with permagum. Connect the zero end of the manometer to the discharge (supply) side of the system. On ducted systems, connect the other end of manometer to the return duct as above. Open all return air registers and check for clean filter.

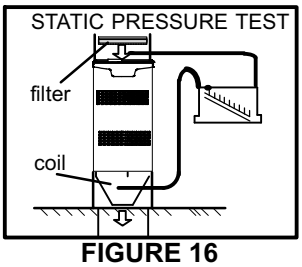


**FIGURE 16**

3 - With only the blower motor running and the evaporator coil dry, observe the manometer reading. Adjust blower motor speed to deliver the air desired according to the job requirements. For heating speed external static pressure drop must not be more than 0.8" W.C. For cooling speed external static pressure drop must not be more than 1.0" W.C.

4 - Seal the hole when the check is complete.

## VI-MAINTENANCE

**⚠WARNING**

**Disconnect power before servicing unit.**

**⚠CAUTION**

**Label all wires prior to disconnection when servicing controls. Wiring errors can cause improper and dangerous operation. Verify proper operation after servicing.**

At the beginning of each heating season, a qualified technician should check the system as follows:

### A-Blower

Check the blower wheel for debris and clean if necessary. The blower motors are prelubricated for extended bearing life. No further lubrication is needed.

**⚠WARNING**

**The inner blower access panel and vent pipe must be securely in place when the blower and burners are operating. Gas fumes, which could contain carbon monoxide, can be drawn into living space resulting in personal injury or death.**

### B-Filters

All filters are installed external to the unit. Filters should be inspected monthly. Clean or replace the filters when necessary to ensure that the furnace operates properly. Replacement filters must be rated for high velocity airflow.

### C-Flue and Chimney

Check the flue pipe, chimney and all connections for tightness and to make sure there is no blockage.

A "Disconnected Vent" warning sticker should be attached to a visible area of the plenum near the vent pipe. If the sticker is not legible or missing, order kit 66W04 for replacement stickers.

### D-Electrical

1 - Check all wiring for loose connections.

2 - Check for the correct voltage at the furnace (furnace operating). Correct voltage is 120VAC ± 10%

3 - Check amp-draw on the blower motor with inner blower access panel in place
Unit Nameplate_____Actual_____

### E-Heat Exchanger and Burners

**Cleaning the Heat Exchanger and Burners**

*NOTE - Use papers or protective covering in front of the furnace during cleaning.*

1 - Turn off both electrical and gas power supplies to furnace.

2 - Remove flue pipe, top cap, flue chase and internal flue pipe assembly from the unit.

3 - Label the wires from gas valve, rollout switches, primary limit switch and make-up box then disconnect them.

4 - Remove the screws that secure the combustion air inducer/pressure switch assembly to the collector box. Carefully remove the combustion air inducer to avoid damaging blower gasket. If gasket is damaged, it must be replaced to prevent leakage.

5 - Remove the collector box located behind the combustion air inducer. Be careful with the collector box gasket. If the gasket is damaged, it must be replaced to prevent leakage.

6 - Disconnect gas supply piping. Remove the screw securing the burner box cover and remove cover. Remove the four screws securing the burner manifold assembly to the vestibule panel and remove the assembly from the unit.

7 - Remove screws securing burner box and remove burner box.

8 - Remove screws from both sides, top and bottom of vestibule panel.

9 - Remove heat exchanger. It may be necessary to spread cabinet side to allow more room. If so, remove five screws from the left side or right side of cabinet. See figure 18.

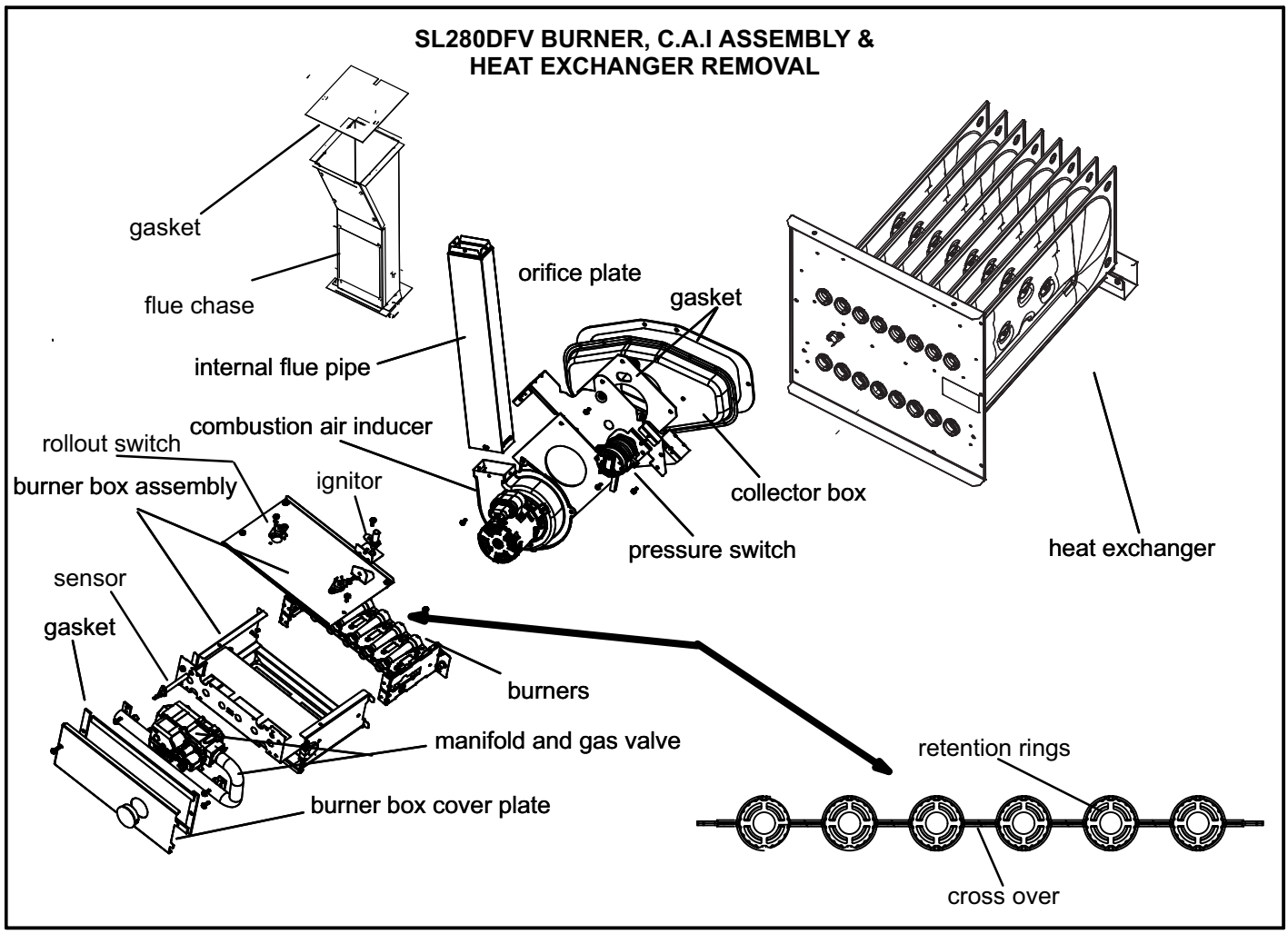



**FIGURE 17**

10- Back wash using steam. Begin from the burner opening on each clam. Steam must not exceed 275°F.

11- To clean burners, run a vacuum cleaner with a soft brush attachment over the face of burners. Visually inspect inside the burners and crossovers for any blockage caused by foreign matter. Remove any blockage. Figure 17 shows burner detail.

12- To clean the combustion air inducer visually inspect and using a wire brush clean where necessary. Use compressed air to clean off debris and any rust.

13- Reinstall heat exchanger in vestibule. (Replace the five screws in the cabinet from step 10 if removed).

14- Reinstall collector box, combustion air assembly, internal flue pipe and flue chase. **Seal with high temperature RTV**. Reinstall all screws to the collector box and combustion air inducer. Failure to replace all screws may cause leaks. Inspect gaskets for any damage and replace if necessary.

15- Reinstall burner box, manifold assembly and burner box cover.

16- Reconnect all wires.

17- Reconnect top cap and vent pipe to combustion air inducer outlet.

18- Reconnect gas supply piping.

19- Turn on power and gas supply to unit.

20- Set thermostat and check for proper operation.

21- Check all piping connections, factory and field, for gas leaks. Use a leak detecting solution or other preferred means.

## ⚠ CAUTION

**Some soaps used for leak detection are corrosive to certain metals. Carefully rinse piping thoroughly after leak test has been completed. Do not use matches, candles, flame or other sources of ignition to check for gas leaks.**

22- If a leak is detected, shut gas and electricity off and repair leak.

23- Repeat steps 21 and 23 until no leaks are detected.

24- Replace access panel.

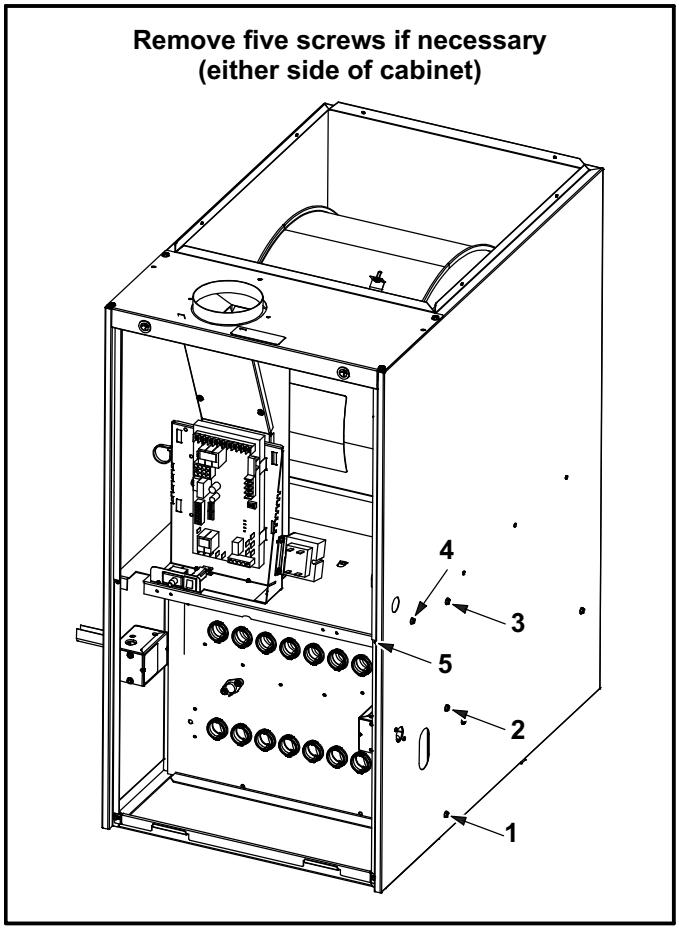
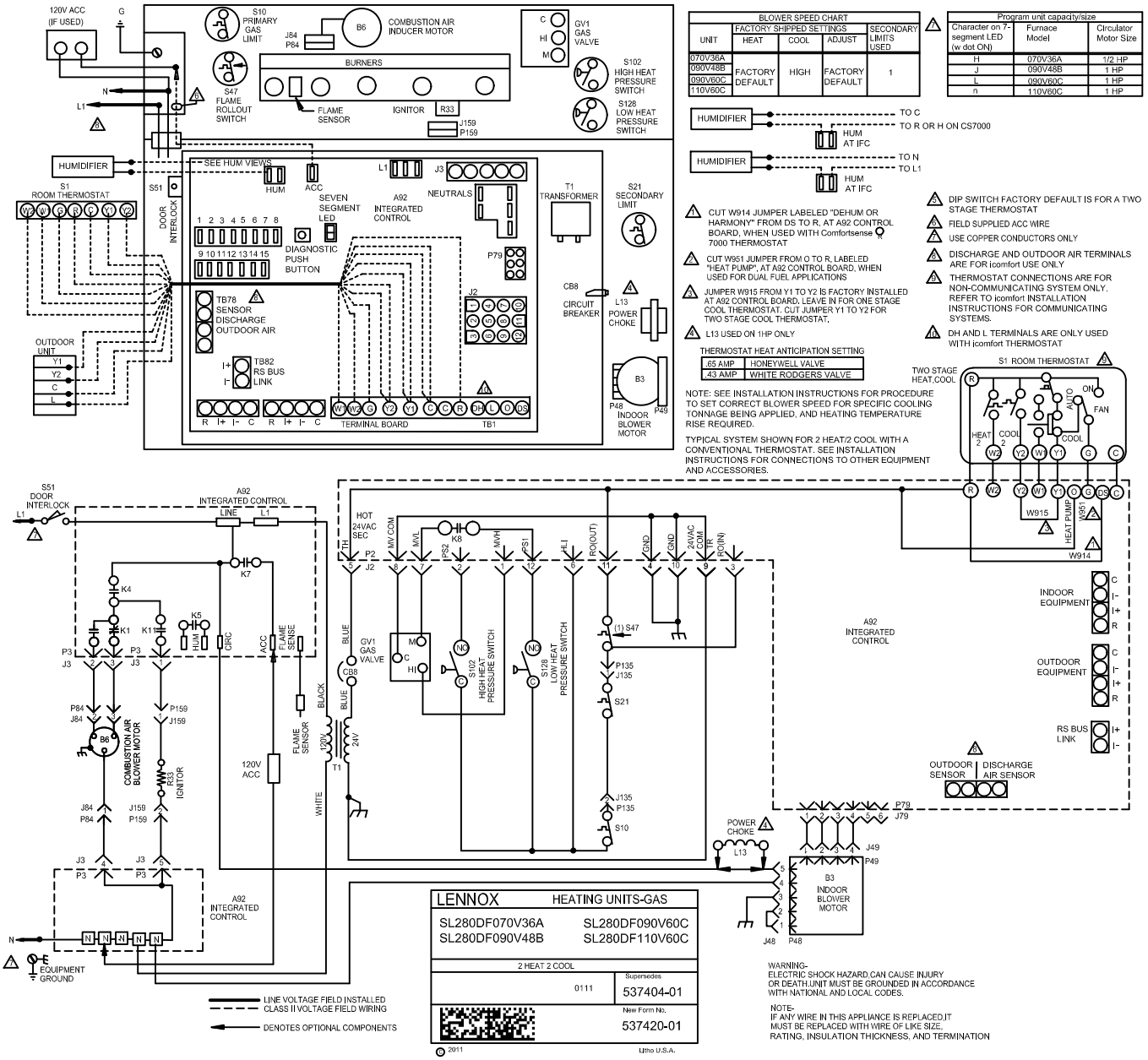



**FIGURE 18**

## VII- Wiring and Sequence of Operation

# SL280DFV Schematic Wiring Diagram



**A-Sequence of Operation**

*Sequence depends on type thermostat used. SL280DFV units are applicable for single stage or two stage thermostats. Both type thermostats are described below. Thermostat DIP switch selection dictates which mode unit will operate in. See flow chart for more sequence detail.*

**SureLight Control Self Check**

When there is a call for heat, the SureLight integrated control runs a self check. The control checks for S10 primary limit, S21 secondary limit (s) and S47 rollout switch normally closed contacts. The control also checks for S102 high heat and S128 low heat prove switch normally open contacts. Once self check is complete and all safety switches are operational, heat call can continue.

**Two-Stage Thermostat, Two Stage Heat. DIP Switch set at *"TWO"***

1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode. High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
*NOTE - If the low fire pressure switch does not close the combustion air inducer will switch to high fire. After a 15 second pre-purge the high fire pressure switch will close and the unit will begin operation on high fire. After 20 seconds of high fire operation the unit will switch to low fire.*

2- SureLight control begins 20 second ignitor warm up period.

3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.

4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.

5- After 45 second delay, indoor blower B3 is energized on low heat speed.
*The furnace will stay in this mode until first stage demand is satisfied OR a second stage heat demand is initiated.*

6- Second stage heat demand initiated. A 30 second second stage recognition period begins.

7- The combustion air inducer ramps up to high heat speed.

8- S102 high heat prove switch closes and the gas valve energizes second stage heat.

9- B3 indoor blower ramps up to high heat speed.

**Single-Stage Thermostat, Two Stage Heat. DIP Switch set at "*SINGLE*"**

1- SureLight control energizes combustion air inducer B6 on low heat speed. Combustion air inducer runs until S128 low heat prove switch contacts close (switch must close within 2 1/2 minutes or control goes into Watchguard Pressure Switch mode. High heat prove switch S102 may also close). A 15 second pre-purge follows once S128 closes.
*NOTE - If the low fire pressure switch does not close the combustion air inducer will switch to high fire. After a 15 second pre-purge the high fire pressure switch will close and the unit will begin operation on high fire. After 20 seconds of high fire operation the unit will switch to low fire.*

2- SureLight control begins 20 second ignitor warm up period.

3- Gas valve opens on first stage for a 4 second trial for ignition. Ignitor stays energized during the trial or until flame sensed.

4- Flame is sensed, gas valve remains on first stage heat, ignitor de-energizes.

5- After 45 second delay, indoor blower B3 is energized on low heat speed.

6- A 10 minute (factory set) or 15 minute (field set) second stage heat delay period begins.

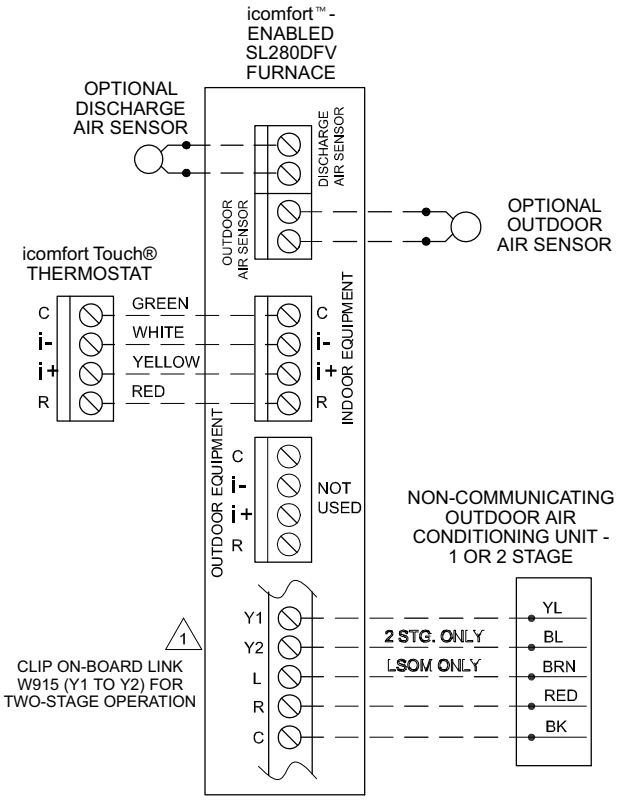
7- After the delay the combustion air inducer ramps up to high heat speed.

8- S102 high heat prove switch closes and the gas valve energizes second stage heat.

9- B3 indoor blower ramps up to high heat speed.

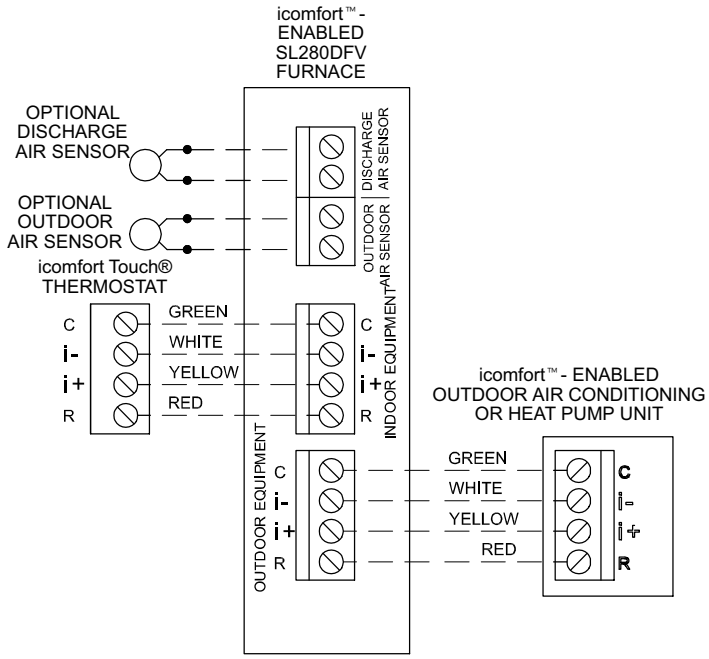
## icomfort Touch® Thermostat with SL280DFV and Non-Communicating Outdoor Unit

icomfort Touch® Thermostat
icomfort™-Enabled SL280DFV Indoor Furnace
Non-Communicating Outdoor Air Conditioner

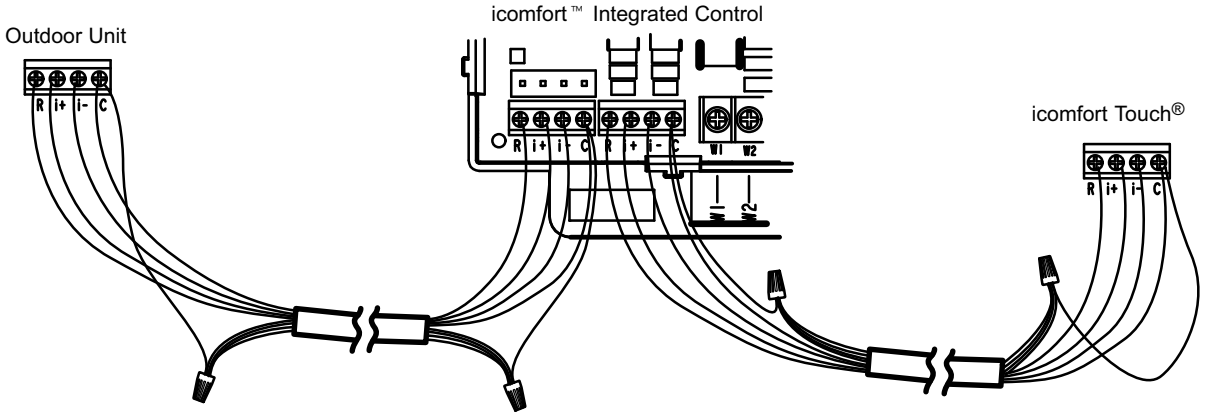



## icomfort Touch® Thermostat with SL280DFV and icomfort™-ENABLED Outdoor Unit

icomfort Touch® Thermostat
icomfort™-Enabled SL280DFV Indoor Furnace
icomfort™-Enabled Outdoor Air Conditioner or Heat Pump



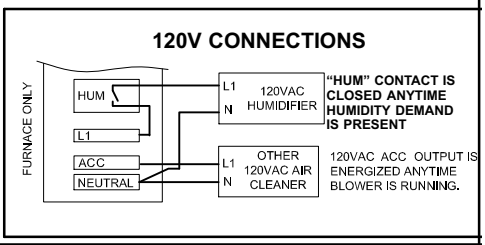

*NOTE - On communicating systems, extra wires must terminate on the "C" RSBus terminal. Use an additional wire and come off "C" terminal and wire nut all the extra wires together. Termination on the outdoor control must match the indoor control.*

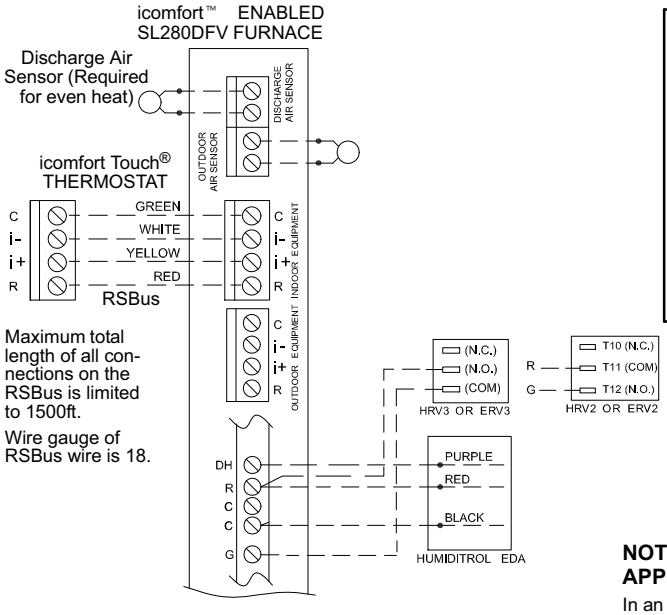


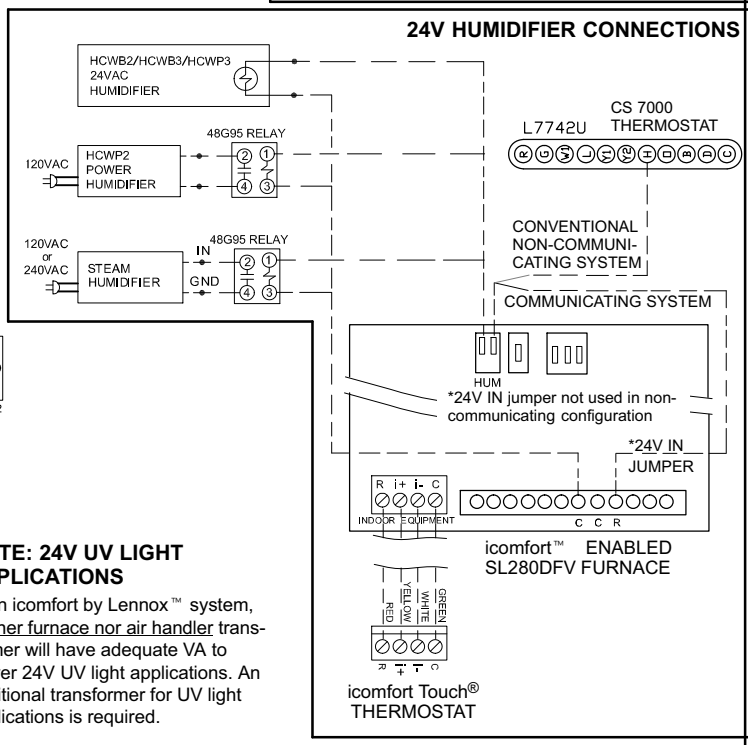
## Optional Accessories for use with any icomfort Touch® System

NOTE: icomfort Touch® THERMOSTAT SENSES HUMIDITY & CONTROLS HUM CONTACTS TO CYCLE HUMIDIFIER BASED ON DEMAND. NO OTHER CONTROL OR HUMIDISTAT REQUIRED.

OPTIONAL OUTDOOR AIR SENSOR FOR USE WITH HUMIDIFIER (IF NOT ALREADY IN THE SYSTEM FOR OTHER FUNCTIONS. BUILT INTO ALL icomfort by Lennox™ OUTDOOR UNITS).

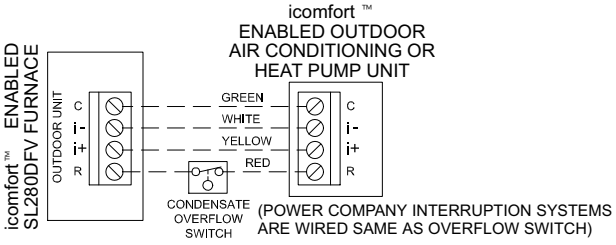


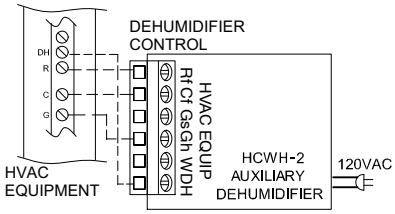



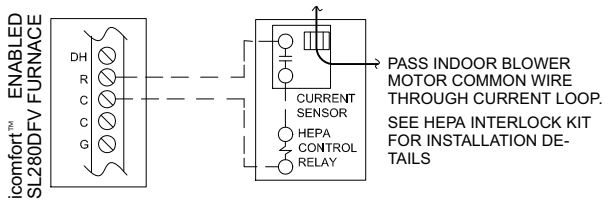

**NOTE: 24V UV LIGHT APPLICATIONS**

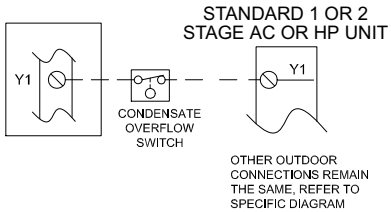
In an icomfort by Lennox™ system, neither furnace nor air handler transformer will have adequate VA to power 24V UV light applications. An additional transformer for UV light applications is required.



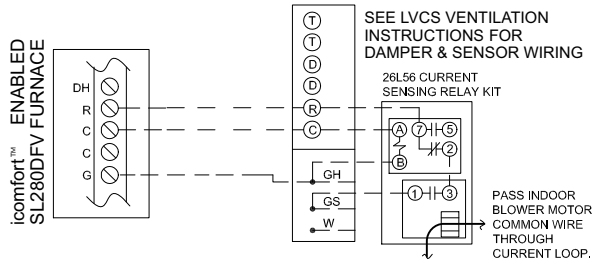

### HEPA BYPASS FILTER X2680 HEPA INTERLOCK KIT

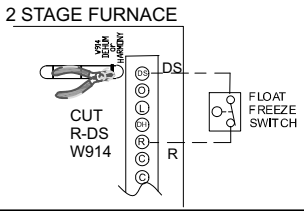




STANDARD 1 OR 2 STAGE AC OR HP UNIT
Y1
CONDENSATE OVERFLOW SWITCH
Y1
OTHER OUTDOOR CONNECTIONS REMAIN THE SAME, REFER TO SPECIFIC DIAGRAM

**NON-COMMUNICATING SYSTEM WIRING**

### LVCS VENTILATION CONTROL SYSTEM




**COMMUNICATING SYSTEM WIRING**

**FIGURE 1**

## VIII- Program Unit Capacity Size Mode

**Power-Up** - Number displayed represents by integrated control unit size code (furnace model and capacity). If three horizontal bars are displayed followed by continuous E203, furnace control does not recognize **unit size code.** Configure per the following:

Furnace control in **IDLE** mode No heating, cooling or indoor fan operation)

Yes

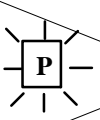
No

Turn room thermostat to **OFF**

To enter **Program Unit Capacity/Size:** push and hold button next to 7-segment LED display until **solid "P"** symbol appears. Release button.

***IMPORTANT**: Field replacement controls may need to be manually configured to validate furnace unit size code.*

Solid **P** starts blinking on 7-Segment LED




Push and hold button. Integrated control will display unit size code number for each furnace model for three seconds.

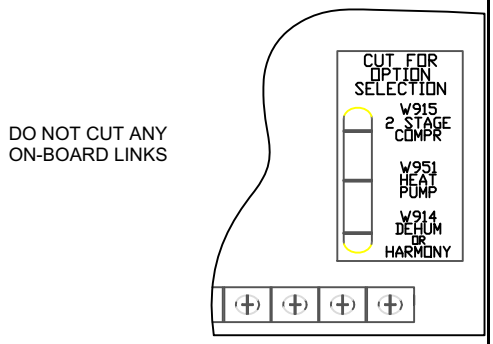
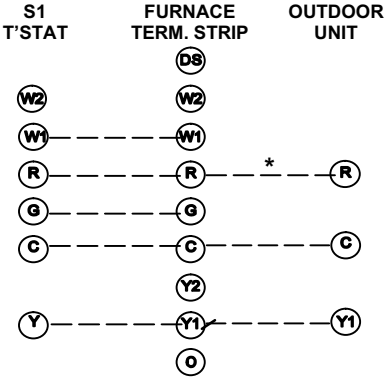
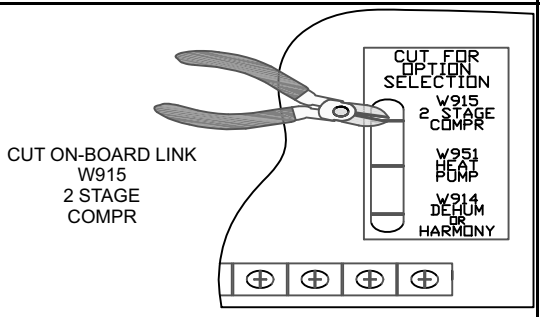
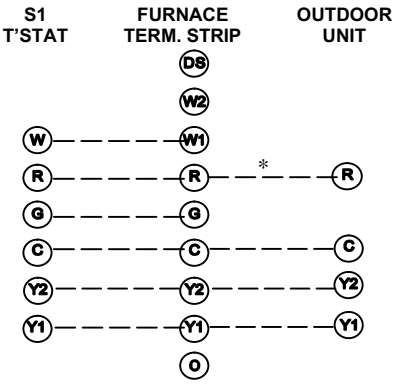
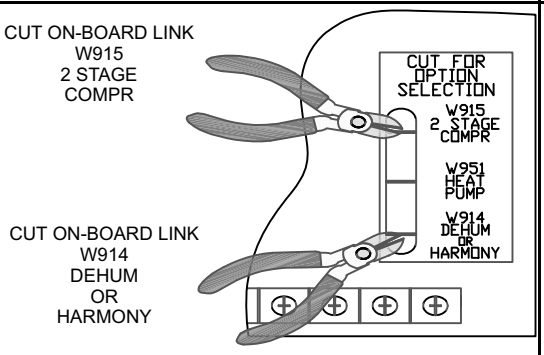
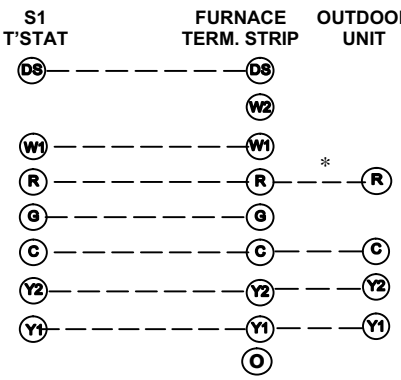
| UNIT SIZE CODE | FURNACE MODEL |
|---|---|
| H | SL280DF070V36A |
| J | SL280DF090V48B |
| L | SL280DF090V60C |
| n | SL280DF110V60C |

When the correct unit size code is displayed, release button. Selected code will flash for 10-second period. During that period, press and hold push button for 5 seconds. Integrated control will store code in memory and will automatically exit **Program Unit Capacity/Size Mode** and reset. (If second period expires or push button is held less than five seconds, control will automatically exit **Program Capacity/Size Mode** and go into **IDLE** mode without storing unit size code. If this happens, programming function must be repeated).

Verify that the selected unit size code is correct and stored in non-volatile memory by cycling the 24 volt power to the furnace control. (At 24 volt power-up of the furnace control, the 7-segment LED will display a unit size code. If three horizontal bars display, board does not recognize unit size code. Programming function must be repeated)

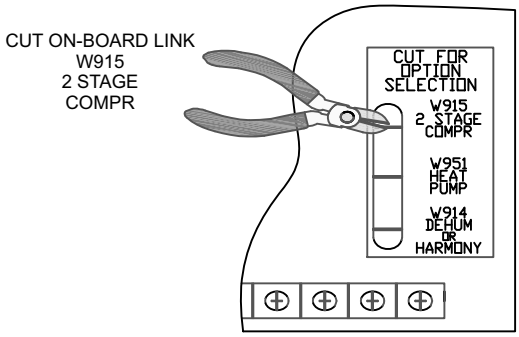
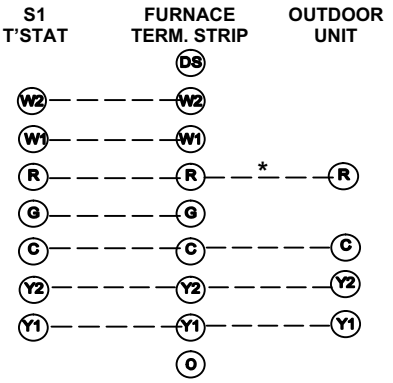
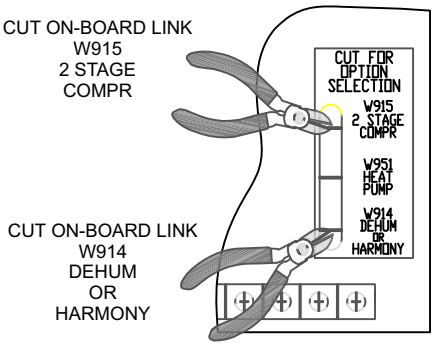
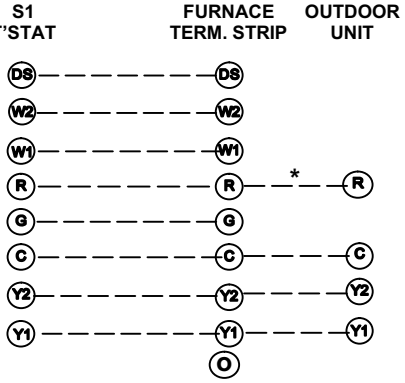
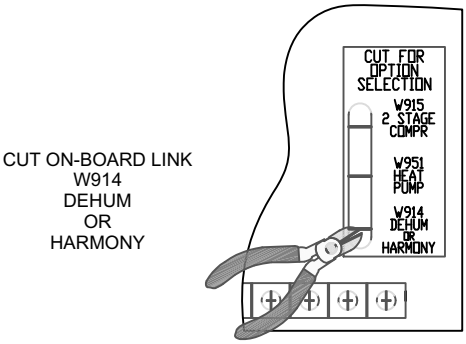
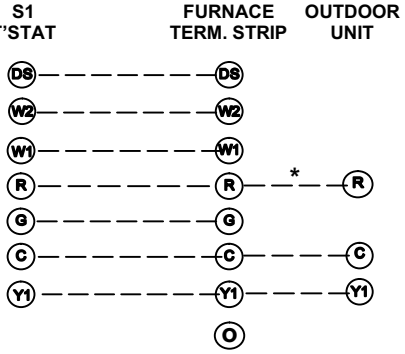
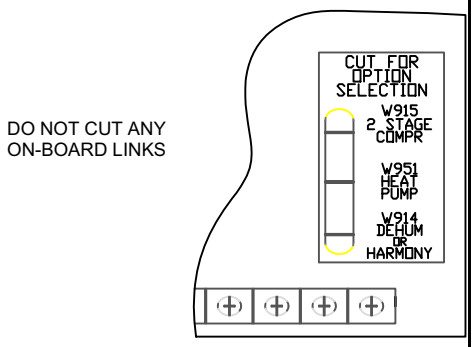
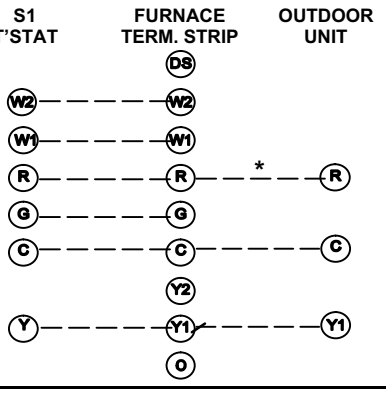
FINISHED

## IX- SL280 Field Wiring Applications With Conventional Thermostat

| Thermostat | DIP Switch Settings and On-Board Links (See figure 4) | | Wiring Connections |
|---|---|---|---|
| | DIP Switch 1 Thermostat Heating Stages | On Board Links Must Be Cut To Select System Options | |
| 1 Heat / 1 Cool<br>*NOTE - Use DIP switch 2 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.* | ON |  |  |
| 1 Heat / 2 Cool<br>*NOTE - Use DIP switch 2 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.* | ON |  |  |
| 1 Heat / 2 Cool with t'stat with humidity control<br>*NOTE - Use DIP switch 2 to set second-stage heat ON delay. OFF-7 minutes. ON-12 minutes.* | ON |  |  |

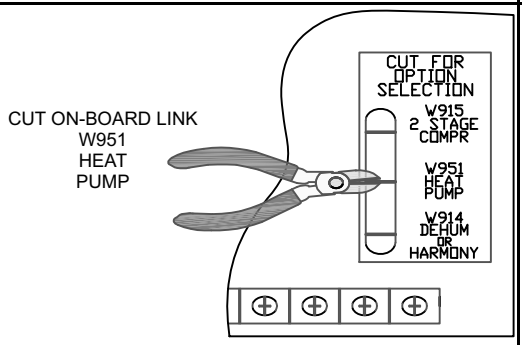
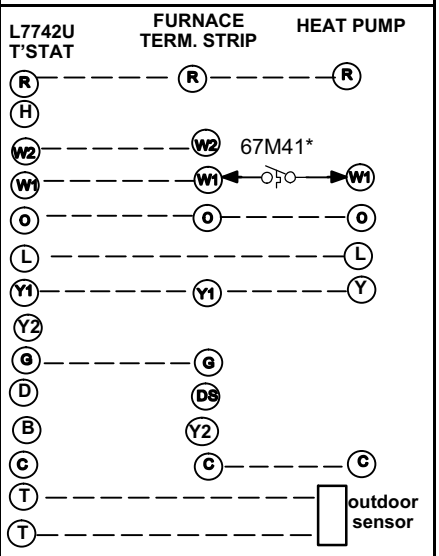
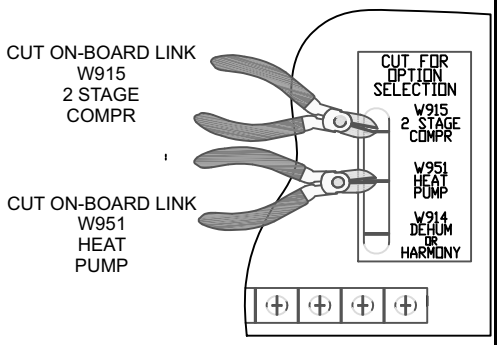
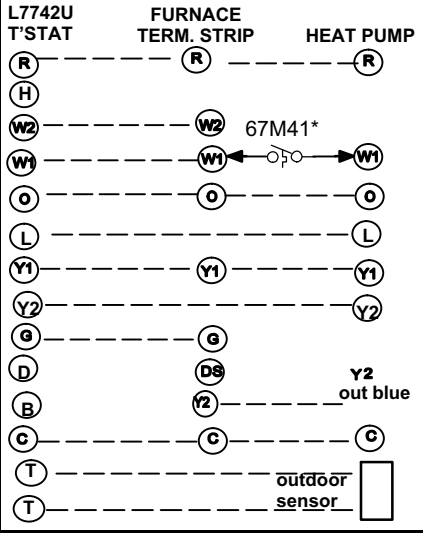
** Not required on all units.*

**SL280 Field Wiring Applications With Conventional Thermostat Continued**

| Thermostat | DIP Switch Settings and On-Board Links (See figure 4) | | Wiring Connections |
|---|---|---|---|
| | DIP Switch 1 Thermostat Heating Stages | On Board Links Must Be Cut To Select System Options | |
| 2 Heat / 2 Cool | OFF |  |  |
| 2 Heat / 2 Cool with t'stat with humidity control | OFF |  |  |
| 2 Heat / 1 Cool with t'stat with humidity control | OFF |  |  |
| 2 Heat / 1 Cool | OFF |  |  |

** Not required on all units.*

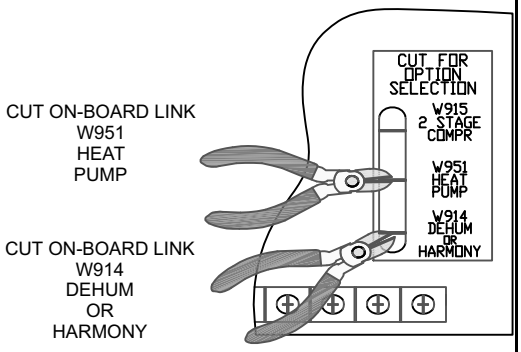
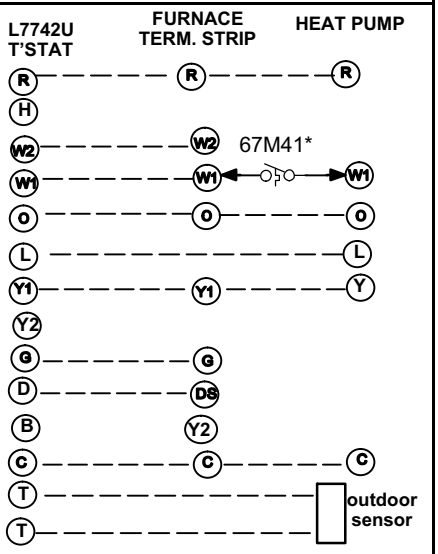
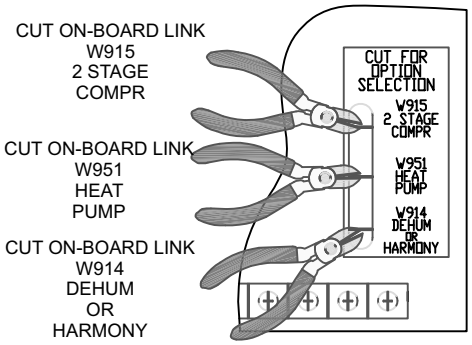
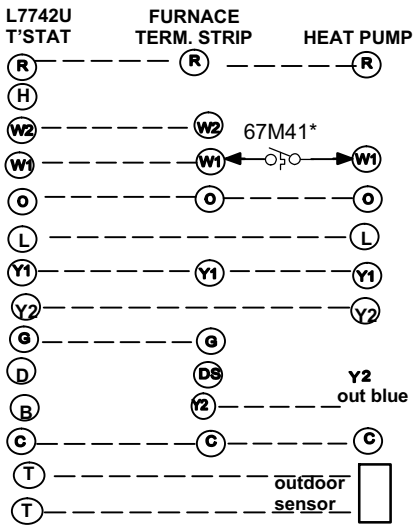
**SL280 Field Wiring Applications With Conventional Thermostat Continued**

| Thermostat | DIP Switch Settings and On-Board Links (figure 4) | | Wiring Connections |
|---|---|---|---|
| | DIP Switch 1 Thermostat Heating Stages | On Board Links Must Be Cut To Select System Options | |
| Dual Fuel Single Stage Heat Pump<br><br>ComfortSense 7000 L7742U thermostat w/ dual fuel capa-bilities<br>Capable of 2 stage gas heat control | OFF |  |  |
| Dual Fuel Two Stage Heat Pump<br><br>ComfortSense 7000 L7742U thermostat w/ dual fuel capa-bilities<br>Capable of 2 stage gas heat control | OFF |  |  |

** Connect W1 to W1 ONLY if using defrost tempering kit 67M41*

*NOTE - **Do NOT** make a wire connection between the room thermostat L terminal and the L terminal of the SL280 integrated control.*

**SL280 Field Wiring Applications With Conventional Thermostat Continued**

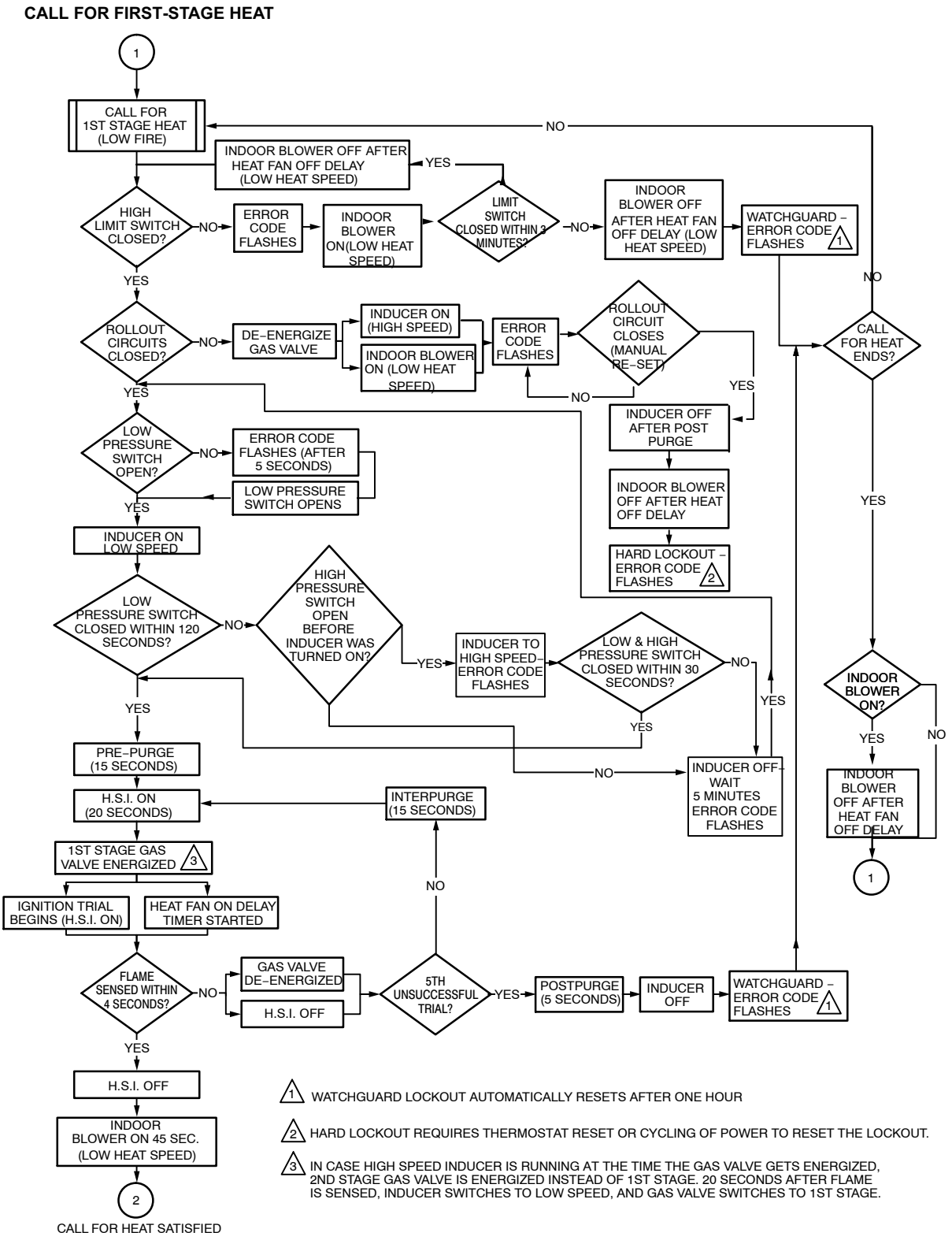
| Thermostat | DIP Switch Settings and On-Board Links (figure 4) | | Wiring Connections |
|---|---|---|---|
| | DIP Switch 1 Thermostat Heating Stages | On Board Links Must Be Cut To Select System Options | |
| Dual Fuel Single Stage Heat Pump<br><br>ComfortSense 7000 L7742U thermostat w/ dual fuel capabilities<br>Capable of 2 stage gas heat control w/dehumidification control | OFF |  |  |
| Dual Fuel Two Stage Heat Pump<br><br>ComfortSense 7000 L7742U thermostat w/ dual fuel capabilities<br>Capable of 2 stage gas heat control w/dehumidification | OFF |  |  |

** Connect W1 to W1 ONLY if using defrost tempering kit 67M41*

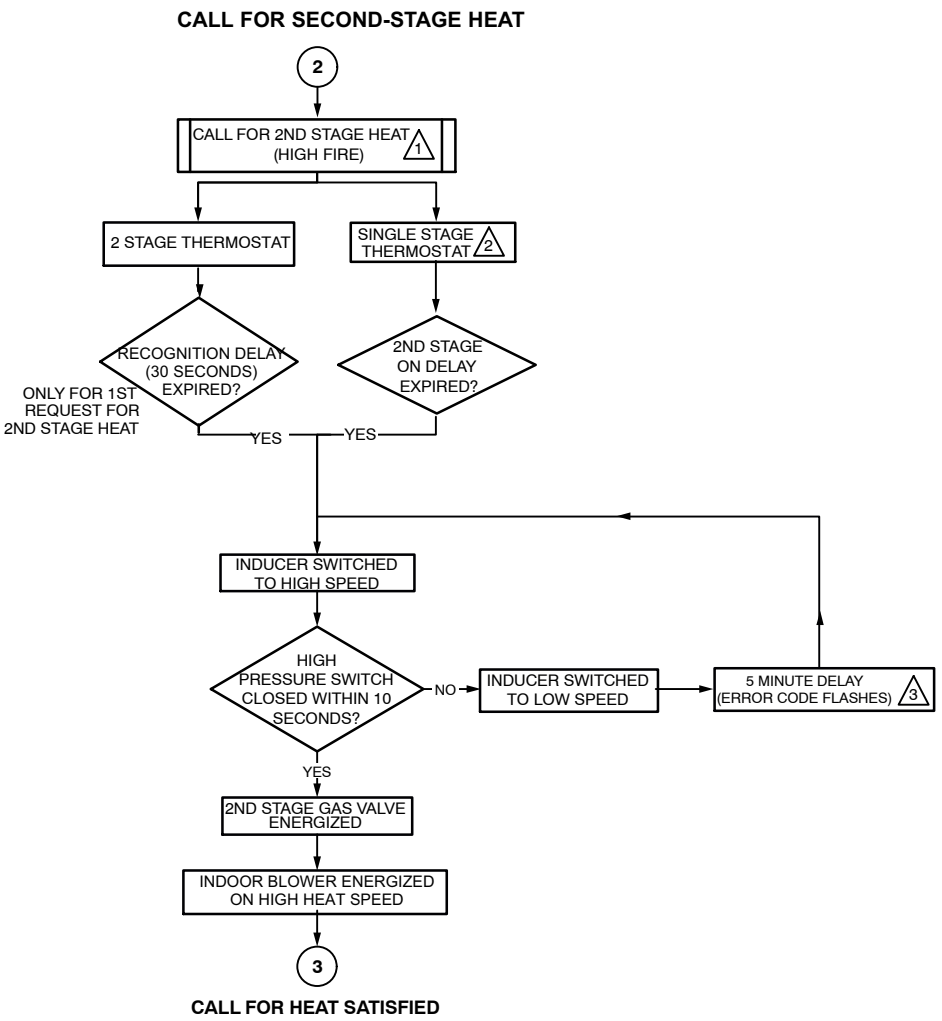
*NOTE - **Do NOT** make a wire connection between the room thermostat L terminal and the L terminal of the SL280 integrated control.*

## X- Troubleshooting

## Troubleshooting: Heating Sequence of Operation


CALL FOR FIRST-STAGE HEAT
1
CALL FOR 1ST STAGE HEAT (LOW FIRE)
NO
INDOOR BLOWER OFF AFTER HEAT FAN OFF DELAY (LOW HEAT SPEED)
YES
HIGH LIMIT SWITCH CLOSED?
NO
ERROR CODE FLASHES
INDOOR BLOWER ON(LOW HEAT SPEED)
LIMIT SWITCH CLOSED WITHIN 3 MINUTES?
NO
INDOOR BLOWER OFF AFTER HEAT FAN OFF DELAY (LOW HEAT SPEED)
WATCHGUARD – ERROR CODE FLASHES 1
YES
ROLLOUT CIRCUITS CLOSED?
NO
DE–ENERGIZE GAS VALVE
INDUCER ON (HIGH SPEED)
INDOOR BLOWER ON (LOW HEAT SPEED)
ERROR CODE FLASHES
ROLLOUT CIRCUIT CLOSES (MANUAL RE–SET)
NO
YES
CALL FOR HEAT ENDS?
NO
YES
INDUCER OFF AFTER POST PURGE
INDOOR BLOWER OFF AFTER HEAT OFF DELAY
HARD LOCKOUT – ERROR CODE FLASHES 2
LOW PRESSURE SWITCH OPEN?
NO
ERROR CODE FLASHES (AFTER 5 SECONDS)
LOW PRESSURE SWITCH OPENS
YES
INDUCER ON LOW SPEED
LOW PRESSURE SWITCH CLOSED WITHIN 120 SECONDS?
NO
HIGH PRESSURE SWITCH OPEN BEFORE INDUCER WAS TURNED ON?
YES
INDUCER TO HIGH SPEED– ERROR CODE FLASHES
LOW & HIGH PRESSURE SWITCH CLOSED WITHIN 30 SECONDS?
NO
YES
YES
INDOOR BLOWER ON?
YES
NO
INDOOR BLOWER OFF AFTER HEAT FAN OFF DELAY
1
PRE–PURGE (15 SECONDS)
H.S.I. ON (20 SECONDS)
INTERPURGE (15 SECONDS)
INDUCER OFF– WAIT 5 MINUTES ERROR CODE FLASHES
1ST STAGE GAS VALVE ENERGIZED 3
IGNITION TRIAL BEGINS (H.S.I. ON)
HEAT FAN ON DELAY TIMER STARTED
FLAME SENSED WITHIN 4 SECONDS?
NO
GAS VALVE DE–ENERGIZED
H.S.I. OFF
5TH UNSUCCESSFUL TRIAL?
YES
POSTPURGE (5 SECONDS)
INDUCER OFF
WATCHGUARD – ERROR CODE FLASHES 1
YES
H.S.I. OFF
INDOOR BLOWER ON 45 SEC. (LOW HEAT SPEED)
2
CALL FOR HEAT SATISFIED
1 WATCHGUARD LOCKOUT AUTOMATICALLY RESETS AFTER ONE HOUR
2 HARD LOCKOUT REQUIRES THERMOSTAT RESET OR CYCLING OF POWER TO RESET THE LOCKOUT.
3 IN CASE HIGH SPEED INDUCER IS RUNNING AT THE TIME THE GAS VALVE GETS ENERGIZED, 2ND STAGE GAS VALVE IS ENERGIZED INSTEAD OF 1ST STAGE. 20 SECONDS AFTER FLAME IS SENSED, INDUCER SWITCHES TO LOW SPEED, AND GAS VALVE SWITCHES TO 1ST STAGE.

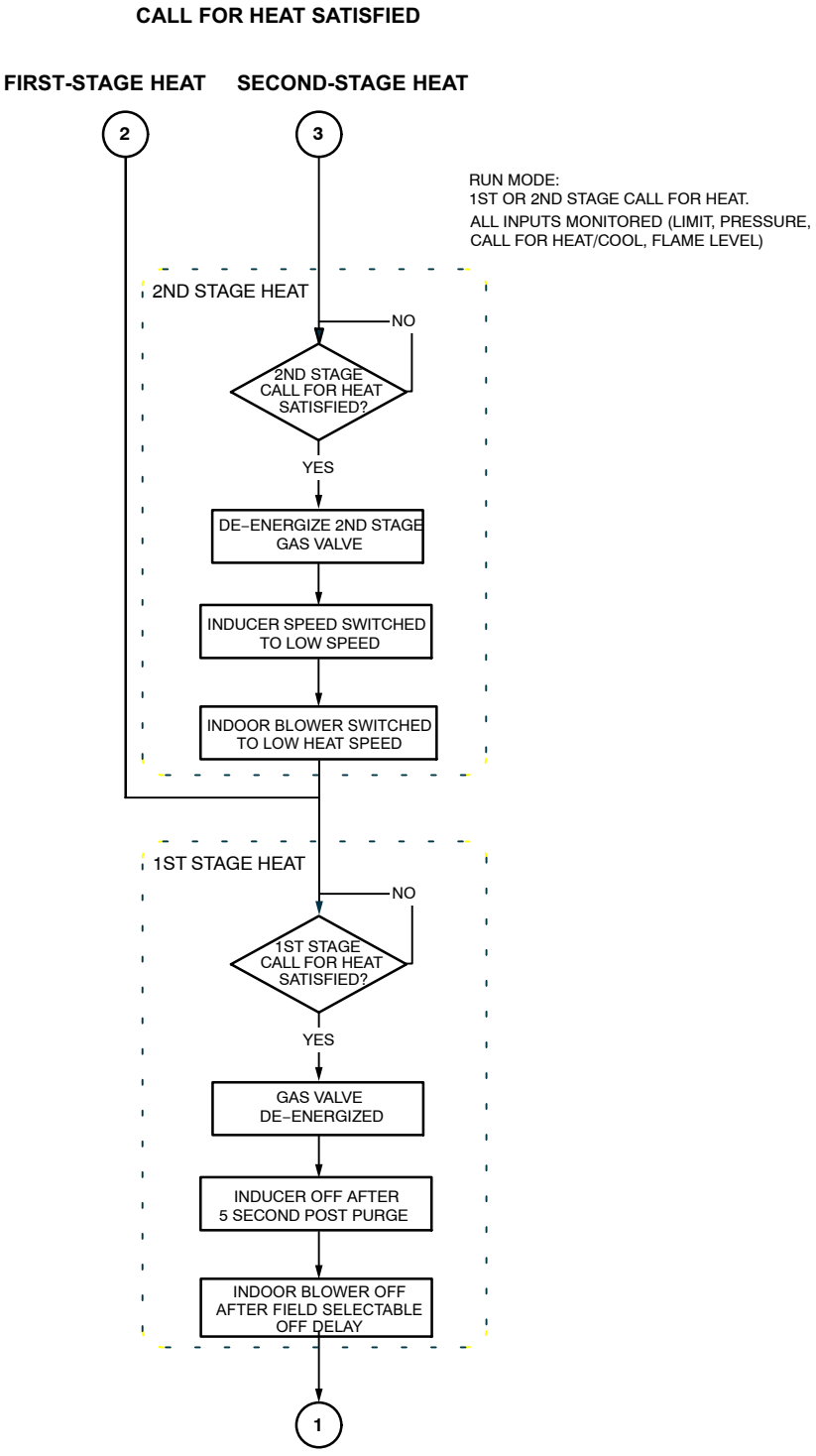
## Troubleshooting: Heating Sequence of Operation (Continued)


CALL FOR SECOND-STAGE HEAT
2
CALL FOR 2ND STAGE HEAT (HIGH FIRE) 1
2 STAGE THERMOSTAT
SINGLE STAGE THERMOSTAT 2
RECOGNITION DELAY (30 SECONDS) EXPIRED?
ONLY FOR 1ST REQUEST FOR 2ND STAGE HEAT
2ND STAGE ON DELAY EXPIRED?
YES
YES
INDUCER SWITCHED TO HIGH SPEED
HIGH PRESSURE SWITCH CLOSED WITHIN 10 SECONDS?
NO
INDUCER SWITCHED TO LOW SPEED
5 MINUTE DELAY (ERROR CODE FLASHES) 3
YES
2ND STAGE GAS VALVE ENERGIZED
INDOOR BLOWER ENERGIZED ON HIGH HEAT SPEED
3
CALL FOR HEAT SATISFIED

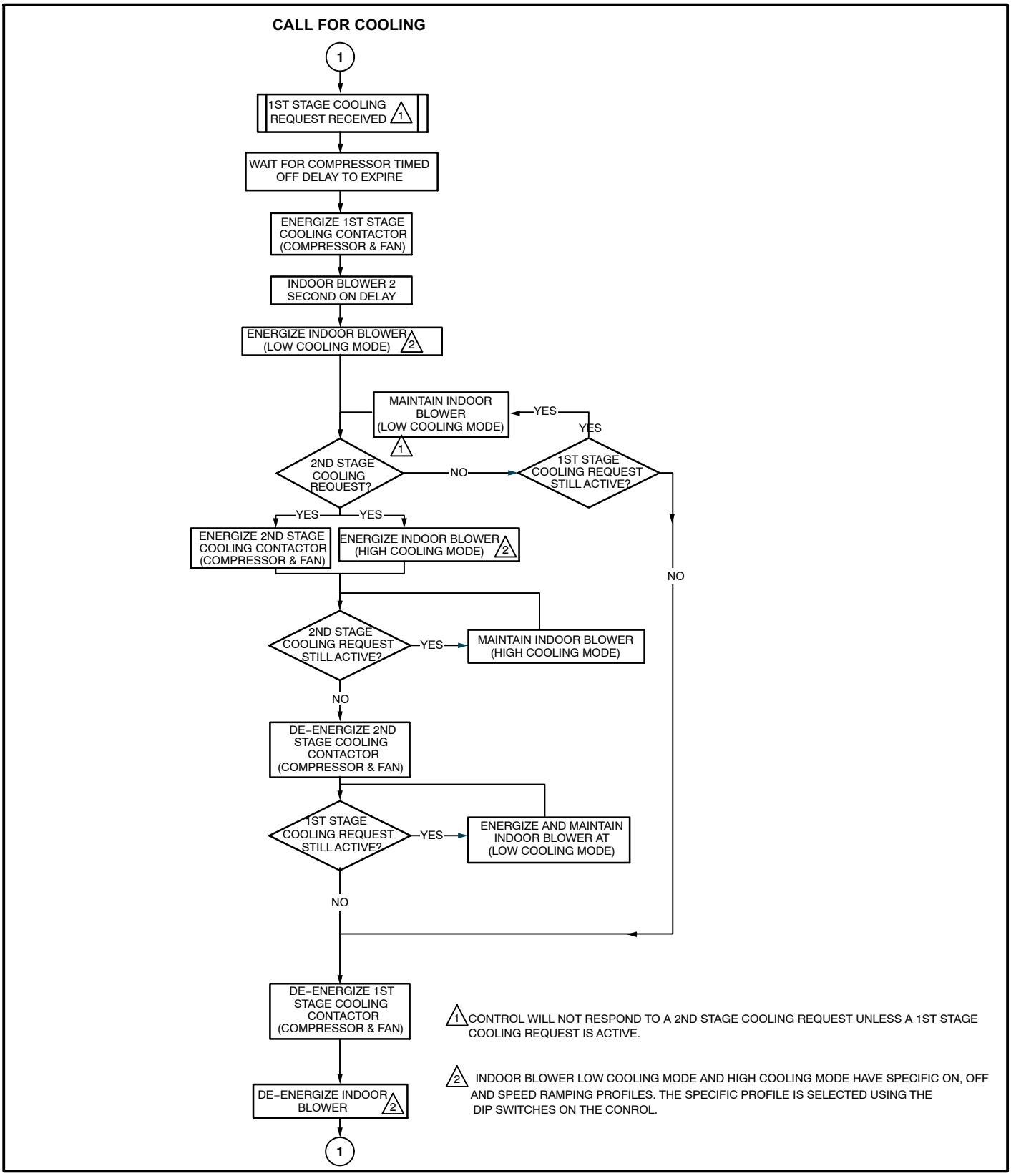
1 SYSTEM WILL ALWAYS LIGHT ON LOW FIIRE, EVEN IF 2ND STAGE HEAT IS IN PLACE.

2 WHEN USED WITH A SINGLE STAGE THERMOSTAT, SET SW1 TO THE ON POSITION IN DIP SWITCH S1.

3 IF THE HIGH FIRE PRESSURE SWITCH DOES NOT CLOSE WITHIN 5 ATTEMPTS, THE SYSTEM WILL OPERATE AT LOW FIRE FOR THE REMAINDER OF THE CALL FOR HEAT REQUEST.


CALL FOR HEAT SATISFIED
FIRST-STAGE HEAT
SECOND-STAGE HEAT
2
3
RUN MODE:
1ST OR 2ND STAGE CALL FOR HEAT.
ALL INPUTS MONITORED (LIMIT, PRESSURE, CALL FOR HEAT/COOL, FLAME LEVEL)
2ND STAGE HEAT
NO
2ND STAGE CALL FOR HEAT SATISFIED?
YES
DE–ENERGIZE 2ND STAGE GAS VALVE
INDUCER SPEED SWITCHED TO LOW SPEED
INDOOR BLOWER SWITCHED TO LOW HEAT SPEED
1ST STAGE HEAT
NO
1ST STAGE CALL FOR HEAT SATISFIED?
YES
GAS VALVE DE–ENERGIZED
INDUCER OFF AFTER 5 SECOND POST PURGE
INDOOR BLOWER OFF AFTER FIELD SELECTABLE OFF DELAY
1

## Troubleshooting: Cooling Sequence of Operation (Continued)


CALL FOR COOLING
1
1ST STAGE COOLING REQUEST RECEIVED 1
WAIT FOR COMPRESSOR TIMED OFF DELAY TO EXPIRE
ENERGIZE 1ST STAGE COOLING CONTACTOR (COMPRESSOR & FAN)
INDOOR BLOWER 2 SECOND ON DELAY
ENERGIZE INDOOR BLOWER (LOW COOLING MODE) 2
MAINTAIN INDOOR BLOWER (LOW COOLING MODE) 1
YES
YES
2ND STAGE COOLING REQUEST?
NO
1ST STAGE COOLING REQUEST STILL ACTIVE?
YES
YES
ENERGIZE 2ND STAGE COOLING CONTACTOR (COMPRESSOR & FAN)
ENERGIZE INDOOR BLOWER (HIGH COOLING MODE) 2
NO
2ND STAGE COOLING REQUEST STILL ACTIVE?
YES
MAINTAIN INDOOR BLOWER (HIGH COOLING MODE)
NO
DE–ENERGIZE 2ND STAGE COOLING CONTACTOR (COMPRESSOR & FAN)
1ST STAGE COOLING REQUEST STILL ACTIVE?
YES
ENERGIZE AND MAINTAIN INDOOR BLOWER AT (LOW COOLING MODE)
NO
DE–ENERGIZE 1ST STAGE COOLING CONTACTOR (COMPRESSOR & FAN)
DE–ENERGIZE INDOOR BLOWER 2
1
1 CONTROL WILL NOT RESPOND TO A 2ND STAGE COOLING REQUEST UNLESS A 1ST STAGE COOLING REQUEST IS ACTIVE.
2 INDOOR BLOWER LOW COOLING MODE AND HIGH COOLING MODE HAVE SPECIFIC ON, OFF AND SPEED RAMPING PROFILES. THE SPECIFIC PROFILE IS SELECTED USING THE DIP SWITCHES ON THE CONROL.

## Troubleshooting: Continuous Fan Sequence of Operation